Introduction

Industrial gold mining is a natural choice for studying the socioeconomic impact of natural resources in Africa. As noted in chapter 1, Ghana, Mali, and Tanzania—the three case study countries—are not new gold producers, but the advent of large-scale industrial gold mining is recent and growing rapidly. Hence, it is possible to discern changes brought about by large-scale mining through “before and after” type studies, as well as by studying the outcomes and changes in mining areas as opposed to nonmining areas. That said, each of the three countries is a case in itself, so the studies constitute an integral part of the overall analysis by considering specific country contexts. This chapter summarizes elements of the country case studies, noting similarities and contrasts.

The point of departure in each of them comes from the tension between the national or macroeconomic gains and local gains from minerals. This arises because in all three countries, subsurface minerals belong to the state, with the central government as guardian of the ownership rights; local host communities have no property rights to the minerals. For the country, the benefits flow from exports and fiscal revenue. So for the mining areas, these benefits may appear remote and their impact minor or imperceptible.

Nevertheless, there are impacts, and these are felt through three mechanisms or channels: (1) market channel: employment, income, and other positive spillovers such as improved infrastructure, worker training, and management; (2) government revenue: since government is the main recipient of the benefits from the minerals, the channel by which revenues are distributed to subnational authorities and, particularly, mining ones, is a key determinant of the local impact; and (3) negative externalities: the revenue benefits are national but the environmental and other costs such as congestion and population displacement
will be local. As noted in chapters 1 and 2, while the national cost-benefit analysis may have a positive balance, the mining areas themselves may not. The case studies therefore track the impact of mining through these channels to gain insights into the country-specific institutions, practices, and outcomes. This chapter examines the findings after giving a brief description of the role of large-scale mining in each of the countries.

**Country Backgrounds: Gold Mining in the Case Study Countries**

Large-scale gold mining and extractive industries in general are relatively capital-intensive. From a macro perspective, the returns to domestic factors of production, in particular labor, are quite small since foreign multinational companies own much of the capital. Thus, because mining is not a major employment generator, the national benefits from mining are mostly from government revenue and net exports.

The contribution of gold mining to gross domestic product (GDP) in each of the case study countries is modest. In Mali, the poorest of the three, about 7 percent of GDP is from mining and quarrying; in Ghana it is 5.5 percent (Bermudez-Lugo 2012); and in Tanzania 4 percent. In all three countries, however, the value of gold exports is substantial (figure 3.1), and gold is an important component of exports. Gold averaged 69 percent of exports from 2000 and 2013 in Mali, 38 percent in Ghana, and 31 percent in Tanzania (figure 3.2). Mali is particularly sensitive to the price of gold because gold is such a large part of the country’s exports. Indeed, Sanoh and Coulibaly (2015) note the perception that the price of gold is the key determinant of Mali’s business cycles. Although this dependence is not as strong in Ghana and Tanzania, it is nevertheless significant. Not surprisingly, the price of gold is a key determinant of the terms of trade, which is always a crucial factor in the macroeconomic fluctuations of developing countries.

The contribution of gold mining to government revenue varies across the three countries. Revenue from gold mining constitutes 25 percent of central government income in Mali, 4.9 percent in Ghana, and barely 2.5 percent in Tanzania. The contribution of gold mining to fiscal revenues is discussed later in this chapter.

Recent trends show that large-scale mining has contributed to the surge in exports and government revenue from mining. Gold mining, however, is not new to the three countries, and has for the most part been done by artisanal and small-scale miners. Box 3.1 summarizes the background papers that explore this activity.
Figure 3.1 Gold Exports in Ghana, Mali, and Tanzania, 2000–13


Figure 3.2 Gold Exports as a Share of Total Exports in Ghana, Mali, and Tanzania, 2000–13

Artisanal and Small-Scale Mining

Sometimes known as traditional or informal miners, artisanal and small-scale miners combine mining with activities such as agriculture and livestock breeding, or even with informal activities such as services and craftwork. The sector’s size fluctuates with the gold price and other employment opportunities. The scale of artisanal and small-scale mining also varies considerably, from cooperative ventures to individual miners. Some operations are licensed, but others operate informally. For these reasons, it is also difficult to estimate the numbers involved in this activity at any given time.

For Ghana, the estimated number of artisanal and small-scale miners in 1998 was 200,000, and there are now thought to be as many as 1 million. The number is also difficult to estimate for Tanzania, though Smith and Kinyondo (2015) report 550,000. The authors also estimate Tanzania’s output from artisanal and small-scale mining as being equivalent to that of a single large-scale mine. Their survey of a few informal mining sites in Tanzania showed that 50 percent of the artisanal and small-scale miners regarded this activity as their sole source of income, and about 25 percent of them had been active in the sector for five to 10 years. This suggests the activity is more stable than commonly thought.

For Mali, the exact number of artisanal mining sites is unknown, but was estimated by the government to be 350 in 2009. In addition, the number of communes reporting artisanal gold mining as an important economic activity has risen, from nine communes in 2006 to 17 in 2008 and 25 in 2013. Estimates of employment in the sector vary considerably—6,000, 200,000, and up to 1 million, according to different sources (Sanoh and Coulibaly 2015). However, the latest population census estimates the number of people involved in artisanal and small-scale gold mining at 25,000.

Because of its informality, the sector is notoriously difficult to tax and regulate. In Ghana, 300,000 workers are estimated to be involved in unlicensed (that is, illegal) mining; these are known as galamseys. Although the evidence is mostly anecdotal, the sector is thought to be riddled with lawlessness and hazardous working conditions. Accidents involving injury and death are frequent but often go unreported. Miners are also exposed to mercury and cyanide poisoning, and to environmental hazards including water pollution. In Mali, local authorities receive payment of duties and taxes in the allocation of permits or titles authorizing artisanal mining.

Despite the sector’s importance, this study does not provide estimates of the impact of artisanal and small-scale mining because the household survey data used for the empirical part do not identify households that obtain their livelihood in the sector. Because of this, we cannot account for their contribution to these impacts or ways in which the opening of a large-scale mine affect artisanal and small-scale miners. This presents challenges to the exact identification of the impact of large-scale mining. However, we do encourage future work that will undertake data collection through surveys on artisanal and small-scale mining to underpin a systematic study of its impacts.
Channel 1: Employment, Linkages, and Positive Spillovers

Modern large-scale mining does not employ many workers. It has historically been capital-intensive, and this feature increased with technological progress. At the country level, this magnifies the extent of the windfalls through exports and central government revenue, but it may also lower the amount of value added paid to indigenous factors, mainly labor. Thus, extractive industries have been characterized as “enclaves,” cut off from the domestic economy except through royalties and taxes. The benefits to the economy therefore depend crucially on how the central government uses the windfalls. And, as is well known, that is often not wisely in developing countries.

Partly in response to criticism that employment in mines is low, mining companies and chambers of mines argue that although globally small, the number employed is locally significant and can raise average incomes and expenditures in the vicinity of a mine. It is also argued that mines are linked to local industry through the use of inputs of other goods and services, and that employment is stimulated through these backward linkages. The country case studies examine these claims, complementing the empirical evidence given in chapter 4 on the employment and income effects of proximity to a mine. Analysts argue that industrial mining raises productivity in the area where it is operating by improving infrastructure for its own needs, and also through worker and management training. Mining companies sometimes invest directly through social responsibility endeavors, such as improving infrastructure, health, and education.

Employment

The country case studies report that mining companies employed mostly nationals rather than expatriates, although management jobs went disproportionately to foreigners. In Mali, Sanoh and Coulibaly (2015) report a ratio of 14 national workers to each expatriate, and that on average 78 percent of jobs are held by people working in mines located in three communes (local government entities): Gouandiaka, Sadiola, and Sitakily. Employees of mining firms in Mali earn $1,200 a month on average. National labor survey data suggest that the mean income from mining is higher than the average income for all other economic activities, and considerably so when compared with agriculture or industry.

In Tanzania, employees of large-scale mining firms are typically based at the mine site, but also internationally and in regional offices, including in Mwanza, the country’s second-largest city, and Dar es Salaam, the commercial and administrative hub. The total number of mining jobs, as expected, is relatively small, particularly when compared to a workforce of 22.1 million (2012 census) and the 70,000 Tanzanians entering the labor force each year. Even so, employees of the large mining companies are typically well remunerated compared
with national average income levels. The average monthly income from a manufacturing job is T Sh 103,407, compared to T Sh 76,277 in mining, T Sh 49,693 in construction, T Sh 31,301 in trade, and only T Sh 15,234 in agriculture, currently the largest source of livelihood for Tanzanians (ESRF 2009). Further, it is clear that most employees are Tanzanian and not foreign (figure 3.3), although the balance tilts toward foreign workers when only management positions are considered.

In Ghana, the total number of people employed in mining was 17,103 in 2014 (Government of Ghana 2014), of which only 289 were expatriates. In Tanzania, employment in mining increased from about 2,000 in 2005 to about 7,000 during 2010–13 (figure 3.4); and in Mali, the total number of workers directly employed in mining averaged 3,635 during 2008–13.

**Linkages**

It is difficult to estimate the linkages (or multipliers) because of data limitations. However, although the description of extractive industries as “enclaves” is not accurate, it is also fair to say that their backward linkages are not large. In South Africa, for example, where better data are available, gold mining is estimated to have a multiplier of about 1.8. In other words, for every one mining job created, 1.8 jobs are created elsewhere through backward linkages and expenditure effects. Sanoh and Coulibaly (2015) report that the multiplier is 1.67 in Mali.

Multiplier effects are limited, partly because of the capital intensity of the mining industry, but mostly because of the lack of local cost-effective
procurement opportunities. This could change over time, as mining companies become better acquainted with local markets and suppliers, and as local entrepreneurs learn to take advantage of the new opportunities arising from the expansion of mining activity. In Tanzania, efforts have been made to improve the potential for local procurement, including in services such as catering, vehicle repair, machine shop services, welding, metal work, electrical work, and plumbing. However, the proportion of inputs sourced locally remains low, a situation mirrored in Ghana and Mali. Although there is always a temptation to increase the linkages through local content laws, governments may be better advised to focus on developing the conditions for improved procurement rather than mandating it. McMahon and Moreira (2014, 43) caution that “the failed experience of many import-substitution plans suggests that linkages cannot be forced upon the mining sector without enabling business conditions.” Instead, they advocate a focus on improving business conditions, such as better power and transportation infrastructure, adequate human capital, access to finance, economies of scale, and outreach or technical assistance programs.

The country case studies and the empirical results confirm that mines do succeed in raising incomes for those living in their vicinity. The higher wages attract migrant workers, which can raise some prices such as rents and food,
so that some local residents who may not be recipients of higher mine wages experience a loss of real income. The inflow of workers may also strain social services and crowd out some original residents.

**Externalities**

Direct development investment by mining firms has traditionally been labeled corporate social responsibility; typical projects include building secondary schools, clinics, and water infrastructure. For example, Newmont Ghana Gold supported Ghana’s Ahafo region through a partnership in the health sector by building housing for resident nurses and three community health compounds in local villages, and equipping 60 local health volunteers with bicycles and medical equipment. However, a growing trend in the three case study countries is for more sustainable projects that offer alternative livelihoods to mining (for example, brickmaking and fisheries) in communities around the mines. This reflects greater interest in helping communities prosper after mine closures (World Bank 2002), and is evidence of widespread recognition of the disappointing development results of corporate social responsibility (Campbell 2012).

Corporate social responsibility projects have had mixed success and take a long time to implement. They face problems and challenges that are similar to those of almost all foreign aid and government interventions, particularly where implementation capacity is limited. The challenges include ensuring the investment has sufficient operational funding to provide an adequate level of the intended service. In Tanzania, for example, mining firms have often promised to build a school or classrooms, with the government pledging to fund equipment and the recurrent costs of providing education. But many of these complementary commitments are not legally binding, and are often not met in a timely manner or at all.

Infrastructure has sometimes been improved by multinational mining firms, but this is rare. It should be noted, however, that gold mining differs from bulk mineral mining, and infrastructure benefits in this sector are usually limited. Roads, for example, only have to be good enough to get inputs to mine sites, since mineral exports are typically flown out.

When linkages cannot be made to national electricity grids, large-scale mines develop their own exclusive power supplies. Other than road improvements, infrastructure benefits are usually associated with corporate social responsibility investments in the community, and therefore are not directly related to production needs. Ayee and Dumisa (2014) note that Ghana opinion surveys reveal unrealistically high expectations by the public from mining. These often focus on the provision of public goods and services, but local governments often lack the capacity to provide these benefits, even when additional revenues are present. Consequently, the public pressures mining companies to step in for the government; for example, by building schools,
health facilities, and transportation infrastructure. Although this may sometimes be the best available option, Ayee and Dumisa (2014) point out that there are obvious risks to ceding responsibility for the provision of public goods to a foreign-based private corporation. Also, mines inevitably stop producing and close, which is always a blow to the local economy—and much more so when the departing company provided basic services.

In Mali, mining companies contribute substantially to local development funds that are not under the control of local authorities.\(^4\) During 1994–2010, their contribution to these funds reached CFAF 20 billion. In addition, they contributed CFAF 7 billion in license fees. In general, the amount of license fees from each mine is lower than the amount of local development funds, except for the Yatéla, Loulou, and Morila mines, which represent 57 percent of the total license fees but only 17 percent of total local development funds. Sadiola commune is by far the biggest contributor, at 59 percent of license fees and 71 percent of local development funds, because the mine there has been operating for the longest (figure 3.5).

The sectoral distribution of development funds within mining communes depends largely on their needs and the complementarity with their budget spending. In Sadiola commune, 23 percent of its fund was spent on agriculture during 1994–2010; in Fourou, almost 83 percent went to education. In Sanso

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**Figure 3.5** Share of License Fees and Local Development Funds in Mali’s Communes, 1994–2010

<table>
<thead>
<tr>
<th></th>
<th>Sadiola</th>
<th>Sitakily</th>
<th>Sanso</th>
<th>Fourou</th>
<th>Gouandiaka</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. License fees</td>
<td>59%</td>
<td>7%</td>
<td>16%</td>
<td>16%</td>
<td>1%</td>
</tr>
<tr>
<td>b. Local development funds</td>
<td>71%</td>
<td>5%</td>
<td>7%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

*Source: Sustainable Development Observatory 2011.*
and Gouandiaka, the focus has been on infrastructure spending (31 percent and 51 percent, respectively). The largest part of Sitakilly’s fund was spent on relocating the local population (table 3.1). Because these funds are controlled by mining companies, they have more sway on how the funds are spent. The government considers these funds as de facto transfers to mining communes, because they come as a deduction from equity returns to be paid to the government (Sustainable Development Observatory 2011).\(^5\)

### Channel 2: Government Revenue

The main sources of government revenue from gold mining are dividends from state equity participation; property rates, ground rents, and profit taxes; excise and import duties; and royalties. Government revenues increased considerably in each of the three case study countries during 2001–13, although levels reportedly dropped in 2014 following a decline in international gold prices. During 2005–13, gold mining provided Mali’s government with $362 million a year (annual average), and, in the same period, Ghana with $300 million and Tanzania with $137 million (figure 3.6). In Mali, primarily customs duties and, later, taxes drove the increase in mining’s contribution to government revenue (figure 3.7).

In Tanzania, tax and royalty payments to government were limited in the years following the opening of the first few large-scale mining projects, reportedly averaging only $30 million a year between 1999 and 2006. This led to the claim that incentives offered to mining companies to attract investment gave away too much in tax exemptions and concessions. Despite an increase in the price of gold, tax holidays meant firms were making only partial corporate tax payments; and despite tightening deal terms, most mineral development agreements have stability agreements locking in the original terms.\(^6\) Nevertheless, taxes and royalties improved, to an average of $77 million a year during 2007–09, and to $260 million during 2010–13. But it is still questionable whether Tanzania received a fair amount of tax and royalty payments, given the volume of minerals produced.

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**Table 3.1 Sectoral Spending, by Commune, of Mining Development Funds in Mali, 1994–2010**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Sadiola</th>
<th>Sitakilly</th>
<th>Sanso</th>
<th>Fourou</th>
<th>Gouandiaka</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>10.9</td>
<td>5.4</td>
<td>2.0</td>
<td>5.4</td>
<td>0.9</td>
</tr>
<tr>
<td>Education</td>
<td>13.9</td>
<td>4.6</td>
<td>26.9</td>
<td>82.7</td>
<td>33.4</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>17.9</td>
<td>10.0</td>
<td>30.9</td>
<td>11.6</td>
<td>50.8</td>
</tr>
<tr>
<td>Agriculture</td>
<td>23.0</td>
<td>9.7</td>
<td>14.0</td>
<td>0.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Other</td>
<td>34.4</td>
<td>70.4</td>
<td>26.3</td>
<td>0.3</td>
<td>14.7</td>
</tr>
</tbody>
</table>

Source: Sustainable Development Observatory 2011.
Figure 3.6 Government Mining Revenues in Ghana, Mali, and Tanzania, 2001–13

Source: Authors’ estimates from administrative data.

Figure 3.7 Government Mining Revenues as a Percentage of Total Revenue in Ghana, Mali, and Tanzania

Source: Authors’ estimates from administrative data.
In Mali, tax revenues from mining increased steadily as a proportion of total government resources, from 10 percent in 2005 to 25 percent in 2013, having peaked at 33 percent in 2012, a year that was particularly difficult for the mobilization of resources because of the war in the north. The strong growth of mining’s contribution to the national budget was due primarily to revenues from customs duties and, second, from domestic taxes.

All three case study countries are concerned about whether gold mining is adequately taxed. Sanoh and Coulibaly (2015) report that in Mali, the tax burden on mining (the ratio of the tax revenues of mining companies to the value added of mining activity) is more significant than the tax burden on the whole economy (the ratio of total tax revenues to the country’s GDP); that is, an average of 57 percent compared to 14 percent (figure 3.8). In 2012, Mali’s seven mining companies and their subcontractors represented 45 percent of all corporate taxes in the country. However, the average tax burden on Mali’s mining sector is similar to those in other mining countries, including Canada (60 percent), Papua New Guinea (55 percent), and South Africa (45 percent) (Bhushan and Juneja 2012). In developed countries the tax burden is a reflection of the high environmental costs of mining, but this is not the case in Mali.

**Fiscal Sharing**

Because the central governments of all three case study countries own the natural resources and therefore the revenues, the benefits from natural resources depend largely on whether revenues are put to good use. If history is a guide,
there is ample reason to be cautious. In the mining sector, the areas where mines are located have no property rights to the minerals, and mining firms may feel deprived of the revenue benefits while bearing the bulk of the costs for developing the mine. The fiscal arrangements between central and local governments at various levels will therefore determine how much of the benefits from mining find their way back to the mining areas. In addition, the competency, honesty, and implementation capacity of local government are key to enhancing welfare and development in mining areas.

The country case studies show that Mali has the highest degree of fiscal decentralization and, as such, local authorities receive a larger proportion of the revenues compared to the other two countries. Ghana is in the middle, and its decentralization efforts are fairly new. Tanzania has a more centralized mechanism, whereby all revenues are collected and allocated by the central government. Transfers from Tanzania’s central budget fund 90% of local government budgets, and the funds are allocated according to criteria and priorities unrelated to the location of mines or the source of the funds.

**Ghana**

Ghana is an administratively centralized country with three local levels—districts, municipalities, and traditional “stools” presided over by chiefs. Mineral resources in Ghana are owned by the people and their management (according to the Constitution) is vested in the hands of the government. The government is the caretaker of the minerals, but corporations can apply for reconnaissance and prospecting licenses to search for specific minerals. The 1992 Constitution recognizes a decentralized local government system as a way to achieve this objective. Since 2007, the government has mandated that 7.5 percent of total government revenues be transferred to metropolitan, municipal, and district assemblies by a district transfer system. To supplement transfers, these assemblies collect internally generated funds from various sources, including rates, license fees, and fines that constitute 1–20 percent of all revenues from the assemblies for the payment of mining royalties. The government takes the biggest share, 90 percent. Of the rest, 4.95 percent is allocated to the assembly, 2.25 percent to the traditional stool where the mine is located, 1.0 percent to the Office of the Administrator of Stool Lands, and 1.80 percent to the traditional council (Ayee and Dumisa 2014).

**Mali**

The local authorities in Mali are recognized as autonomous, with specific responsibilities for the provision of public services. Despite some progress in the administrative and financial empowerment of these local entities, they are still largely under the authority of the central government with regard to resources, and even decisions related to local matters. The government seems to be more
concerned about national unity and territorial integrity than the enhancement of transfers and public resources to communities.

The local authorities in communes where gold production takes place are supposed to receive 60 percent of the local taxes paid by commercial mining firms and 80 percent of the license fees paid by small-scale miners. Producing cercles—the second level administrative subdivision, after the regions—are meant to receive 25 percent and 15 percent of these taxes, respectively, while producing regions retain 15 percent and 5 percent, respectively. Commercial mining companies are exempted from these taxes during the first three years of operation. Local authorities do not have the means to determine the actual level of the license fees that are supposed to be distributed among them—and, in fact, license fees from mining companies are not distributed, as required by law. The share allocated to communes represents 73 percent of the total amounts collected instead of the 60 percent required by law. As a result, all other levels of local authorities receive less than the required percentages: 17 percent at the cercle level (the law requires 25 percent), and 1 percent at the regional level (15 percent required).

In general, Mali’s local authorities have a low rate of revenue collection and therefore weak self-financing capacity. As a result, government transfers and subsidies are the main source of revenue to support investment expenditures. Indeed, analyses of the budgetary accounts from five mining and 24 neighboring communes reveal a low level of tax collection. Because of the licensing fees paid by mining companies to local authorities, mining communes generate more of their own revenues compared to nonmining ones. These license fees represented more than 50 percent of mining commune revenues from 2011 to 2013, compared to just 2 percent for neighboring communes (figures 3.9).

Although mining communes are less dependent on the transfers from the government, they still remain exposed to the risks related to the closing of mines or the drop of production in this sector because license fee payments are a function of turnover.

**Tanzania**

All gold mining revenues in Tanzania go to the central government, except for recent annual fees of $200,000 per mine. Revenues are not earmarked, and so there is little point in tracking how much of the gold mining taxes and royalties make it back to the districts. Tanzania’s gold belongs to the country and not the local population, and the allocation of funds by the central government to local government authorities in gold mining areas is largely unrelated to the mining revenues sourced in that area. In theory, expenditures are linked to a needs-based formula; in practice, substantial inequities exist in the allocation across local government authorities (ODI 2014). The formula is based on various measures of need, but because employment costs dominate transfers, financial flows
for the most part follow the number of public servants (mainly teachers and health workers), and this depends in turn on where public servants can be encouraged to locate. Five of Tanzania’s six local government authorities hosting large-scale gold mining receive fewer transfers in per capita terms than the national average, except for Tarime District Council.

**Negative Externalities: The Costs Borne by Mining Areas**

All types of mining can pollute and cause environmental damage unless carefully managed. But even when mining is carefully managed, local communities still face substantial environmental risks. Mercury is typically used in artisanal and small-scale mining; large-scale gold mining uses cyanide and, although highly toxic, is typically better controlled. Nonetheless, large-scale mines do produce toxic tailings, which can be spread by wind—and when tailings dams rupture, the results can be catastrophic. People are often forced to relocate for environmental and other reasons when a mine opens. If the costs of environmental
damage and resettlement were treated with the same multipliers and subtracted from the overall impact, the declared benefits would be smaller. These external costs are an obvious source of tension between communities and local authorities, and also between local and national governments.

Arguments asserting the existence of a resource curse often point to the potential for natural resource windfalls to exacerbate rent seeking, corruption, and conflict in society. Mining firms face challenges of securing their investments from theft and violence, some of which are fueled by communities perceptions that they are not benefiting from the mine. In April 2009, armed thieves stole about 100 kilograms of gold worth $4.2 million from the Golden Pride Mine in Tanzania; the North Mara Mine has experienced regular raids. More commonplace is the intrusion of small-scale miners onto mine sites to access tailings and other mining opportunities. Despite theft and violence, Tanzania’s mines have continued to produce at a high level (Holeterman 2014).

In Tanzania, large-scale gold mining has been at the center of cases of grand corruption. Take the case of Alex Stewart Assayers. In 2003, the government hired the U.S.-based company to audit gold production following concerns that mining firms were evading taxes and engaging in fraud. The company’s hiring terms were contentious; it received tax-free status, was contracted without a formal tender process, had no experience in auditing mining companies, and received a fee equivalent to 1.9 percent of the market value of the country’s audited gold exports, leaving only 1.1 percentage points of the 3 percent royalty for the government. The audit by Alex Stewart Assayers eventually cost the government $70 million, without revealing any tax evasion or fraud by the large mining companies (Cooksey 2011).

**Outcomes**

The country case studies found only marginal improvements in welfare indicators in mining areas, though a lack of data prevents us from drawing definitive conclusions. The study of Mali was, however, able to exploit a relatively rich data source on socioeconomic indicators, which was unfortunately not available for Ghana and Tanzania.

In Mali, for example, enrollment rates in primary schools clearly increase with proximity to a mine, and are higher in neighboring areas than in more distant ones. Not only are the rates higher, but they also increased faster from 1998 to 2009. Outcomes for poverty reduction are inconclusive, however. Although poverty has declined across Mali, the pace of poverty reduction in mining communes has not been faster compared to nonmining communes (figure 3.10).
Another interesting outcome in Mali is the differential population growth in mining compared with nonmining areas. The national population growth rate averaged 3 percent annually between 1998 and 2009, but the population growth rate in mining communes was almost double the national rate. Mining communes grew on average 5.7 percent annually, compared with 3.5 percent for neighboring communes and other communes within the same cercle (figure 3.11). The population growth rate is above 6 percent in all mining communes, except in Gouandiaka, where, at 2.9 percent, it equals the national rate (figure 3.11, panel b). Because populations migrate from lower- to higher-income areas, the higher population growth in mining is itself indicative of an economic stimulus. However, other things being equal, inward migration tends to slow the rise of wages in mining areas, and it raises average wages in the “donor” ones. This may explain why, despite increased economic activity from mining, the reduction in poverty in mining areas has not significantly outstripped that of other areas. In other words, migration tends to be an equalizer.

Overall social outcomes in Mali are mixed. For access to basic social services, mining communes had low levels of access to electricity and improved cooking fuels before the mining boom started in 1998. For example, fewer than 2 percent of the population used electricity for lighting or improved cooking fuels. However, 30 percent had access to an improved water source, and 50 percent to an improved sanitation facility (table 3.2). In terms of progress, mining...
Figure 3.11 Population Growth Rate by Group of Communes and Mining Communes in Mali, 1998–2009

a. Group of communes

b. Mining communes

communes saw a significant improvement in these services between 1998 and 2009, when they started from a lower base. However, in 2009, only the share of the population using an improved water source was far greater in mining areas. This may explain the better health outcomes for children in the vicinity of mines (Polat et al. 2014; also see chapter 4 below). Beyond indicators of access, infrastructure outcomes in 2013 were not better in mining areas. For example, while paved roads per capita is slightly higher in mining areas, irrigation per capita is lower than in other areas, though this may reflect differences in rainfall or farming intensity. Mining areas also have fewer nurses and midwives per capita than other types of communes (table 3.3).

Table 3.2 Use of Infrastructure Services, by Group of Communes in Mali, 1998 and 2009 (% of population)

<table>
<thead>
<tr>
<th>Type of commune and proximity</th>
<th>1998</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Electric for lighting</td>
<td>Improved water source</td>
</tr>
<tr>
<td>Mining communes</td>
<td>1.88</td>
<td>30.31</td>
</tr>
<tr>
<td>Neighboring communes</td>
<td>2.73</td>
<td>17.37</td>
</tr>
<tr>
<td>1st control within cercle</td>
<td>7.71</td>
<td>23.45</td>
</tr>
<tr>
<td>2nd control within region</td>
<td>2.62</td>
<td>19.38</td>
</tr>
</tbody>
</table>


Table 3.3 Infrastructure Outcomes, by Group of Communes in Mali, 2013

<table>
<thead>
<tr>
<th>Type of commune and proximity</th>
<th>Paved road per 1,000 inh.</th>
<th>Irrigated area per 1,000 inh.</th>
<th>Local health centers per 10,000 inh.</th>
<th>Doctors per 10,000 inh.</th>
<th>Midwives per 5,000 inh.</th>
<th>Nurses per 5,000 inh.</th>
<th>Primary schools per 1,000 inh.</th>
<th>Net primary enrollment (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining communes</td>
<td>6.80</td>
<td>0.73</td>
<td>0.74</td>
<td>0.52</td>
<td>0.06</td>
<td>0.38</td>
<td>0.88</td>
<td>73.00</td>
</tr>
<tr>
<td>Neighbor communes</td>
<td>6.56</td>
<td>4.84</td>
<td>1.17</td>
<td>0.41</td>
<td>0.14</td>
<td>0.82</td>
<td>0.90</td>
<td>63.75</td>
</tr>
<tr>
<td>1st control within cercle</td>
<td>6.16</td>
<td>5.19</td>
<td>1.03</td>
<td>0.42</td>
<td>0.18</td>
<td>0.58</td>
<td>1.02</td>
<td>61.59</td>
</tr>
<tr>
<td>2nd control within region</td>
<td>10.37</td>
<td>6.21</td>
<td>1.07</td>
<td>0.32</td>
<td>0.12</td>
<td>0.72</td>
<td>0.82</td>
<td>55.87</td>
</tr>
</tbody>
</table>

Note: inh = inhabitants.
Figure 3.12 Registered Firms by Employment in Four Tanzanian Towns, 2001 and 2011

The case study of Tanzania uses survey data from 2001 and 2011 to track changes in formal employment opportunities in areas around large gold mines. The results from the surveys suggest a considerable increase in employment opportunities, with additional jobs in 2011 relative to 2001 in mining towns. However, as figure 3.12 shows, most additional jobs were in the public sector. Interestingly, only a small increase in employment opportunities occurred in manufacturing, suggesting that linkages have been fairly limited, although this increase does not support the argument of local Dutch-disease-type effects from gold mining.

Conclusions

All changes in an economy bring costs and benefits, and gainers and losers—and so it is with gold mining. From the case studies reviewed here, there is little evidence of economic decline at the national or local level in the three case study countries. But there is evidence that negative externalities have had an impact on communities close to gold mines. The national benefits most likely outweigh these costs, but it is doubtful that compensation is being made or is effective.

Mining is not a major employment generator. Studies of economic growth emphasize that higher productivity in general, and for extractive industries in particular, is a major source of growth and development. However, if the capital is mostly foreign owned and the industry is capital intensive, then the main domestic recipient of the value generated by the gold mines is the government. Thus, in the final analysis, the welfare effects of gold mining—and mineral extraction in general in developing countries—depend on whether government collects its due and puts it to good use.

The conclusions from the case studies are suggestive, but need to be subjected to rigorous statistical analysis to yield more robust results. This is the subject of chapter 4.

Notes

2. As discussed in chapter 2, costs may also arise in the form of Dutch disease and other elements of the resource curse.
3. GDP records the domestic value added of gold exports—that is, the total value of exports minus the associated imports (though these will sometimes be recorded separately.) Disposable income, however, is the important variable for national welfare. Thus, gross national income, which accounts for factor payments to and
from abroad, will deduct the repatriation of profits by gold-mining companies. Other things being equal, the contribution of mining to national income will be less than its contribution to GDP. The repatriation of revenue will be reduced by the royalties and taxes paid by gold-mining companies. Hence, government revenue represents the domestic capture of the rents from mining.

4. The amounts contributed are not based on any standard formula but are decided by the mine or specified in the mining convention. These funds should be seen as another direct form of compensation for some of the costs imposed by mining activities.

5. The state of Mali owns 20 percent equity in all mines.

6. This delayed the start of the payment of a large-scale gold-mining company corporation tax. Added to this was the concession that mining firms could offset all equipment and machinery costs against revenues, and were exempt from the value added tax on goods and services.

7. These budgetary accounts do not include expenditures by the state on behalf of the communes.

8. For example, when the tailings dam at the Baia Mare gold mine in Romania failed in 2000, cyanide leaked into the Somes River, killing 1,400 tons of fish and contaminating the water supply of 2.5 million people.

9. There are many reasons why mining areas may experience higher population growth; among them are simple migration, better health infrastructure, and higher fertility rates.

10. In an export mineral boom, the booming sector is often the public sector. In this case, however, the increase in public sector employment may be due to population growth, which in part could be because of the mining boom and the inward migration that it attracts.

References


ESRF (Economic and Social Research Foundation). 2009. Governance in Mining Areas in Tanzania with Special References to Land Issues. Dar es Salaam: ESRF.


