



The Future of Resource Taxation:

10 policy ideas to mobilize mining revenues



INTERGOVERNMENTAL FORUM
on Mining, Minerals, Metals and
Sustainable Development

Edited by Alexandra
Readhead, Viola Tarus,
Thomas Lassourd,
Ezera Madzivanyika,
and Bernd Schlenker

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The African Tax Administration Forum (ATAF) is an organization established by African revenue authorities in 2009, aiming to improve the performance of African tax administrations. The tax administrations of 40 countries in Africa are members of ATAF, that is, 74 percent of tax administrations on the continent, making it the premier body on tax matters on the continent. Two countries, Mali, and Somalia were the latest to join the organization in 2020. ATAF believes that better tax administration will enhance economic growth, strengthen the state's accountability to its citizens, and more effectively mobilise domestic resources. Now in its 11th year of existence, ATAF has positioned itself as Africa's homegrown solution to improving revenue collection, advancing the role of taxation in governance and state building, and providing a voice for the continent on international tax issues.



The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) supports its 80 member countries in advancing their sustainable development goals through effective laws, policies, and regulations for the mining sector. We help governments take action to develop inclusive and gender-equitable practices, optimize financial benefits, support livelihoods, and safeguard the environment. Our work covers the full mining life cycle, from exploration to mine closure, and projects of all sizes, from artisanal mining to large-scale operations. Guided by our members' needs, we provide in-country assessments, capacity building, technical training, publications, and events to advance best practices, peer learning, and engagement with industry and civil society.

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Chapter 1. Introduction and Overview

Mining is having a comeback. The transition to a low-carbon economy means society must shift from fossil fuels to renewable energy and transport technologies reliant on minerals and metals. With copper, cobalt, lithium, and many other critical minerals becoming the backbone of the green energy transition, this period is a unique opportunity for resource-rich countries, especially developing countries, to re-imagine domestic resource mobilization for sustainable development.

Mining has, in the past, often failed to deliver the expected revenues to governments. The many reasons for this include overly generous tax incentives, weak governance, poorly constructed contracts, aggressive tax planning by multinationals, and inadequate fiscal policies. Resource-rich countries are now being given a chance to rethink how best to maximize the financial benefits of mining. Considering the devastating economic and social consequences of the pandemic, a deepening debt crisis for developing countries, and declining government revenues from fossil fuels, this mission has never been more important.

Automation is another phenomenon forcing governments to reconsider the traditional benefit-sharing model. While not unique to mining, automation is reducing the number of low-skilled jobs at the mine site—one of the core benefits resource-rich countries expect in return for their non-renewable resources. Re-balancing is required, including a bigger role for government revenues, for mining to be socially and politically viable for many resource-rich developing countries.

Despite these changes in the sector and society, the basic building blocks of mining taxation have remained largely unchanged for several decades. Corporate income tax is typically expected to deliver the primary share of government revenues, followed by royalties on mineral production. There are good arguments for this approach, combining early, predictable revenues from royalties with a share of profitable businesses. In practice, however, corporate income tax can be difficult to collect, delayed, and vulnerable to profit shifting. The International Monetary Fund estimates that African countries lose up to USD 730 million in annual mining revenue from tax base erosion and profit shifting (Albertin et al., 2021).

The ongoing challenges to mining revenue collection give us pause to consider whether the current system of mining taxation remains fit for the 21st century. Are there other ways that resource-rich developing countries might benefit financially from their mineral wealth?

This book is a starting point for answering this question. In July 2020, the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) and the African Tax Administration Forum (ATAF) launched *The Future of Resource Taxation*, an inclusive, multistakeholder dialogue to rethink how developing countries benefit financially from their mineral resources. This initiative built upon both organizations' experience in delivering technical assistance to governments on international and mining tax issues. Governments, civil society, academia, and industry responded to the call, each contributing to the innovative, forward-looking ideas that make up this book (see Section 1.1).

None of the ideas in this book is a silver bullet. They require careful evaluation by governments to determine if they are the right fit, depending on their vision for the sector and fiscal policy goals. But they do expand the policy options available to governments and, importantly, show that several resource-rich countries are already implementing successful approaches to financial benefit sharing that depart from the status quo. Some are incremental—for example, a measure to close a loophole in the fiscal regime—while others represent a radical overhaul of traditional financial benefit-sharing models.

Of course, the success of these proposals depends on a broader enabling environment. Governments require the human and financial resources needed to implement them. Fiscal terms should be transparent to promote accountability and limit corruption. Governments should avoid inefficient and ineffective tax incentives that would undermine the integrity of their legal and policy frameworks. They should limit the use of fiscal stabilization provisions, ensure clear legal obligations on companies to pay their full share of taxes, and use their governmental powers to enforce them. And finally, the implementation of this progressive agenda should be supported by international and regional organizations, bilateral development partners, and civil society significantly scaling up their financial and technical assistance to resource-rich developing countries on mining revenue collection.

The conversation does not stop here. The mining sector and society will continue to evolve in new and different ways that may require governments to further adapt their financial benefit-sharing model. IGF and ATAF are committed to working with resource-rich developing countries and other stakeholders to meet this challenge. IGF, ATAF, and their partners will do this through their government technical assistance programs but also by holding space for new policy ideas and inclusive debate among all stakeholders whose goal it is to transform mineral wealth into meaningful development outcomes.



1.1 The Structure of the Handbook

This handbook is structured as follows:

Chapter 2 highlights the unique features of the mining sector and describes the fiscal instruments that make up the dominant fiscal regime for the sector, specifically, royalties and corporate income tax. It also details the challenges to revenue collection under the current system.

Chapter 3 surveys the global changes that affect how countries benefit financially from the mining sector. Factors such as growing demand for critical minerals, a changing international tax landscape, and a deepening debt crisis for many developing countries mean new opportunities and risks for the mining sector that also require a fiscal policy response.

Chapter 4 provides a framework for evaluating the policy proposals described in the book. It starts by painting a picture of what success looks like for all stakeholders involved in the mining sector. It then highlights the key principles governments often use to analyze their mining fiscal regime and ends with practical tools to support this analysis.

Chapters 5 through 14 are the core contribution of the book. Each chapter describes a specific policy proposal to improve mining revenue collection. It describes the policy objectives, how it would (or does) work in practice, and key benefits and challenges. It also provides recommendations for implementation based on country experience. The 10 proposals are described in Box 1.1.

The final chapter analyzes potential legal challenges to implementing the policy proposals in the book.

Box 1.1 Ten fiscal policy and administrative proposals to transform mining taxation

1

A Minimum Profit Share for Government: As good as it sounds?

There are now several fiscal regimes around the world that require the government to receive a specified share of the profits that a mine generates. These regimes are still based on the payment of royalties and corporate income tax, but they require additional payment if the government's share of profits is below the stipulated threshold. Chapter 5 uses an economic model to analyze this form of "profit sharing" in Tanzania, the Philippines, and Ecuador to determine whether it represents an improvement on the dominant fiscal regime based on royalties and corporate income tax and how it can be further refined.

2

Designing and Implementing Production Sharing Contracts for the Mining Sector

Many governments generate important revenues from their oil sector, often through Production Sharing Contracts, leading some countries to explore whether such a model could be replicated in the mining sector to their benefit. Chapter 6 analyzes how Production Sharing Contracts function and provides recommendations for countries interested in introducing them into their mining sector.

3

State Equity Participation in the Mining Sector

State equity participation is an element of the overall fiscal regime applicable to mining projects that gives states an opportunity to receive revenue and participate in the potential upsides of mining projects. Chapter 7 provides guidance concerning the practical implementation of state equity participation.



4

Increasing Fiscal Benefits Through Commercial State-Owned Enterprises in the Mining Sector

The rise of state-owned enterprises in the mining sector often reflects the desire for countries to regain ownership of their resources. Their proponents often seek to maximize the financial and economic benefits of national mineral assets. Despite mixed historical experiences, the current level of interest in direct state participation makes it important to understand the conditions under which state-owned mining companies can be successful. Chapter 8 gives recommendations to governments that are considering introducing, expanding, or reforming commercial state-owned enterprises in their mining sectors.

5

Variable Royalties: An answer to volatile mineral prices?

Variable royalties can be an improvement over fixed-rate royalties. They provide more flexible revenue than fixed-rate royalties and are easier to implement than profit-based or cash flow-based taxes. Chapter 9 reviews examples of variable royalties from 15 countries, showing what to emulate and what to avoid.

6

Using the Sixth Method to Simplify the Pricing of Related-Party Mineral Sales and Safeguard Mining Revenues

Resource-rich countries in Latin America developed the Sixth Method to address abusive tax planning schemes in transactions involving raw materials or commodities. By using commodity prices quoted on a relevant exchange (e.g., the London Metals Exchange), often with few or no adjustments, it seeks to provide a clear and transparent standard for determining the price of related-party mineral sales that would be easier for tax authorities to apply and less vulnerable to tax avoidance. Chapter 10 aims to provide greater insight into the workings of the Sixth Method, particularly for minerals that are harder to price.

7

Carbon Border Adjustment Mechanisms and Carbon Prices: Taxing mining for the energy transition

The European Union is considering introducing a carbon border adjustment mechanism (CBAM). This CBAM is a tax on imports from outside the bloc on the estimated carbon dioxide emitted in their production that is equal to the price that European Union-made products already pay for such emissions under the bloc's Emissions Trading Scheme. Chapter 11 discusses the potential impact of CBAM on mineral-rich low- and middle-income countries and whether they could introduce their own carbon prices.

8

Securing a Fair Share for Communities Using a Development Turnover Tax

Some of the most critical fiscal instruments in the mining sector target the specific needs of people in resource-rich countries. Chapter 12 proposes a development turnover tax that would compel private mining companies to invest in public shared infrastructure. In the absence of such investments, the national revenue authority would collect a development turnover tax that would be applied to a government-administered mining development fund with similar spending priorities.

9

Competitive Bidding: Can competition for mining rights increase government revenues?

Under the right conditions, competitive bidding can be an efficient way to assign public licences to private companies to extract subsoil resources. Chapter 13 describes the necessary conditions for countries to successfully implement competitive bidding to allocate mining licences and increase their revenue from the sector.

10

Improving the Monitoring of Quarry Production With Remote Monitoring Technologies

In most resource-rich countries, regulatory oversight and revenue mobilization efforts in the mining sector focus on precious minerals at the expense of industrial minerals, such as quarry aggregates. Chapter 14 proposes using remote monitoring technology to afford tax authorities in developing and middle-income countries the ability to monitor the production volumes and sales of quarry aggregates by quarrying companies off-site.

1.2 Crowdsourcing the 10 Policy Proposals

The IGF and ATAF used multisectoral and participatory approaches to collect the 10 policy proposals. They were keen to hear from all stakeholders on diverse proposals, recognizing that there would be differences in points of view and that some ideas would be attractive to some countries or stakeholder groups but less so to others. Their goal was to have an inclusive debate, allow the most interesting ideas to percolate to the top, and recognize that a menu of good options would take us further than assertions that one answer would fit all needs.

Policy ideas were crowdsourced from both government and non-government stakeholders. In April 2021, the IGF and ATAF made an open call to academia, international organizations, civil society, and industry to submit policy and administrative proposals. They received over 30 proposals in response. Each one described the policy objectives and potential impacts on mining revenues for resource-rich developing countries.

In August 2021, the IGF and ATAF surveyed government officials from ministries of mines and finance and tax authorities from resource-rich countries. The survey, which included 12 questions, sought to identify emerging trends, governments' objectives for their mining fiscal policy, any challenges to mining revenue collection, and most importantly, whether they were implementing any policy or administrative innovations in response to these challenges. Ninety-seven officials from 49 countries responded to the survey.

Figure 1.1. Regional responses to the government survey

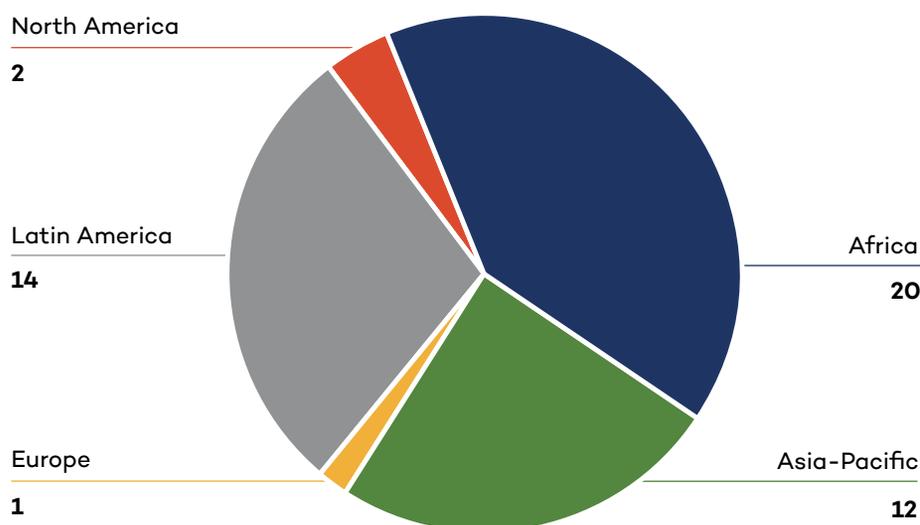
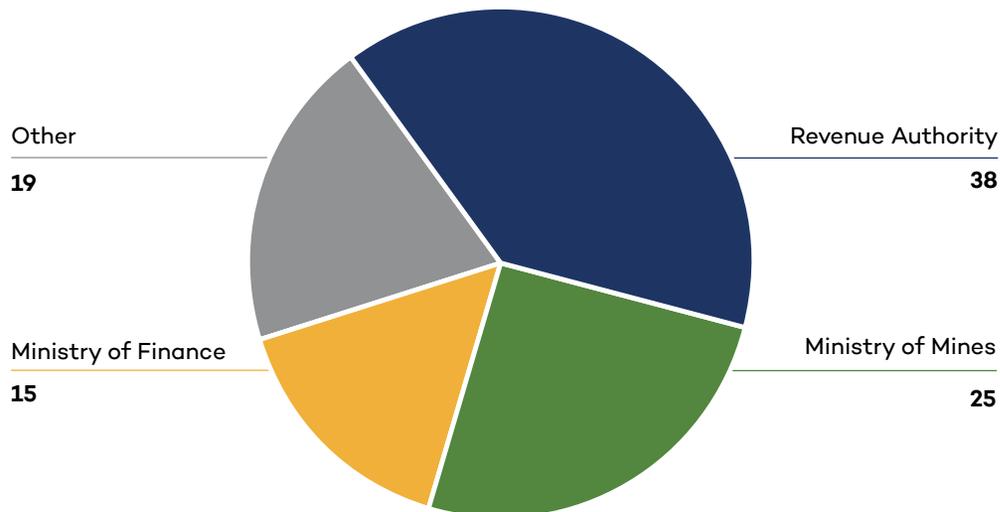


Figure 1.2. Responses to the survey by government institutions



Note: “Other” includes, for example, ministries of energy, land, and geosciences.

The results from the survey and the call for ideas corroborated initial research carried out by the IGF and ATAF to develop a deeper understanding of the role of mining sector investment and the rationale for the taxation of minerals. This research was against the backdrop of unfolding changes in the sector and their effects on how financial benefits flow to governments. The research also catalogued the evolution of mining tax systems and challenges to mining revenue collection. The results of the survey are discussed in the next two chapters.

Each policy proposal was assessed based on the following parameters:

- Innovative—either a government-tested innovation or an untested idea.
- Forward-looking—adapting to how the mining sector and society are changing.
- Responsive to a fiscal challenge or an opportunity in the mining sector.
- Whether it considers the contextual needs of developing countries.



Ten policy proposals were shortlisted. Each one was subjected to further research to assess, in detail, their benefits and risks, as well as how they would work in practice by borrowing lessons from countries already implementing them. The authors conducted both desktop and primary research, conducting interviews with governments, industry, and subject matter experts. Some ideas were also evaluated using economic models. Throughout the process, the IGF and ATAF employed a consultative approach. They assembled a dedicated technical committee with representatives from government, civil society, academia, and international organizations. The committee was involved in shortlisting and developing the ideas. The public was also invited to provide input throughout the process by attending webinars and providing feedback on the ideas during the consultation period. The IGF and ATAF government members and mining industry stakeholders were also invited to provide feedback through separate closed sessions.

The policy proposals contained herein are the result of a collaborative effort by a diverse group united by the common objective of equitable results for all stakeholders based on clearer and fairer rules for all.

1.3 References

Albertin, G., Yontcheva, B., Devlin, D., Devine, H., Gerard, M., Beer, S., Jankulov Suljagic, I., & Thakoor, V. V. (2021). *Tax avoidance in sub-Saharan Africa's mining sector*. International Monetary Fund. <https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2021/09/27/Tax-Avoidance-in-Sub-Saharan-Africas-Mining-Sector-464850>



Chapter 2.

The Status Quo of Mining Taxation

2.1 How Mining is Taxed and Why

Resource taxation has evolved largely distinctly from business taxation more generally. What makes the extractive industries different is, first and foremost, that the resource is a public asset. The national constitutions of most countries vest natural resources, including minerals located within their jurisdictions, in the state. These natural resources are owned by the people and are held in trust for their benefit by the state. This arrangement creates a relationship where the state, acting as a fiduciary, manages the resource wealth for the benefit of its citizens. Mineral resources are also finite and non-renewable—a mineral deposit may be exhausted in less than one generation. These features set the sector apart, necessitating a different approach to fiscal policy—one that aims to maximize revenues subject to other policy goals.

The other features of the extractive sector that are relevant to tax policy-making are the following:

- The resource is location specific, meaning that the investor must operate where the resource is located. This quality makes investments less mobile and therefore less responsive to changes in fiscal terms.
- The sector is highly capital-intensive. Most costs are incurred at the start of the project, with long lead times before revenues are generated.
- There is significant uncertainty. Geological deposits vary across countries and may require different methods of resource extraction, sometimes involving highly specialized technology. Global commodity prices are uncertain and volatile, meaning that revenues are cyclical, which may affect investors' ability to pay taxes.
- Information asymmetry often puts governments at a disadvantage, particularly when negotiating and monitoring fiscal terms (Cameron & Stanley, 2017).

In addition, there is the potential to generate substantial economic rents. When investors are awarded the exclusive right to extract resources, they are often able to sell those resources above their cost of extraction (including a normal, risk-adjusted return on the investment) (Baunsgaard & Devlin, 2021). In principle, governments should be able to tax close to 100% of the associated economic rents without distorting investment decisions. However, it can be hard to precisely measure the rent, and governments attempt to extract it through various fiscal instruments. Rent extraction is a primary concern when determining how governments should benefit financially from mining.

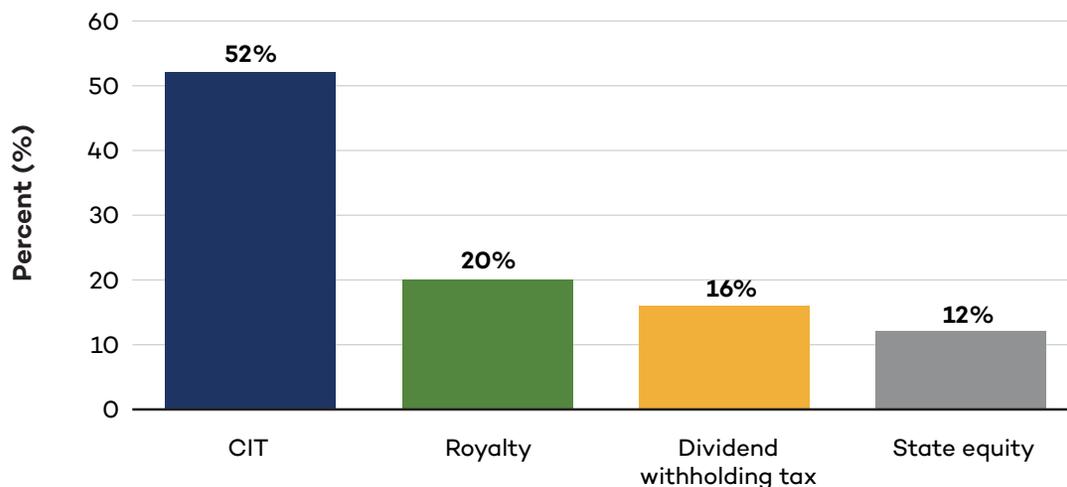
The design of mining tax systems varies, depending on the policy objectives of each host government. However, the basic mineral sector taxation tools have remained the same over the past several decades. The two main elements are corporate income tax (CIT) and royalties, pillars of the so-called “tax/royalty fiscal regime.” CIT is based on net profits, with rates typically varying between 20% and 40%. It has several clear advantages. First, CIT and similar taxes on profits are often part of a generally applicable tax regime. In addition, they are designed to spare loss-making entities but capture an important share of profitable businesses, thereby encouraging investment and economic activity. However, this can result in delays in revenue collection due to the long lead times on the construction of mining operations. CIT collections can lack stability/predictability and are heavily dependent on the timing of the project. Such regimes can also be complicated to administer, prone to poorly designed tax incentives, and vulnerable to profit shifting.

Royalty payments in the minerals sector are typically between 2% and 6% of gross sales (rather than based on profits, as is more common in the oil and gas industry). Governments levy royalties for many reasons. First, they represent a payment for the right to extract non-renewable resources. Their ad valorem design also has advantages. They generate early revenues as soon as a mine starts production rather than when a project is profitable, which may be many years later. They are a reliable source of revenue that is easier for governments to collect compared to profit-based taxes, a factor that is especially important for governments still developing their knowledge of the mining sector. They provide a stable and predictable source of revenue, although this can be affected by production uncertainties and price volatility, depending on the design. Lastly, some governments use royalties to directly benefit the communities. Countries have set up community development funds funded partly by mining royalties to encourage local economic development and social services.

Royalty payments, in theory, should deliver proportionally less than CIT over the life of a mining project (Bouterige et al., 2020). Figure 2.1 is a stylized depiction of the theoretical breakdown of government revenues from mining, according to ex-ante modelling by the International Monetary Fund (IMF). However, in practice, because of the difficulty of collecting CIT, many developing countries tend to collect a much smaller proportion of CIT and rely more heavily on royalty payments (Natural Resources Governance Institute, 2019).



Figure 2.1. Theoretical breakdown of mining revenues by instrument, based on ex-ante modelling¹

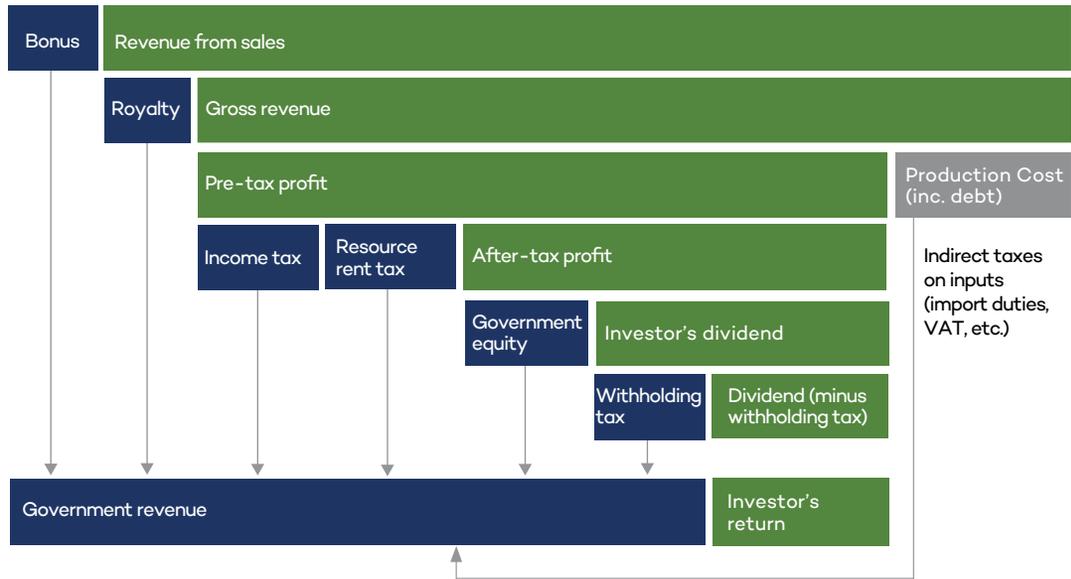


Source: Luca & Mesa Puyo, 2016.

State equity participation in mining projects is becoming more common, although dividends may be significantly delayed or not always guaranteed to follow, making this an unreliable source of revenue. Some countries have introduced windfall or excess profit taxes and, in some cases, repealed them afterwards. They are reappearing in some African countries (Bouterige et al., 2020). Other taxes commonly applied to businesses also apply to the mining sector, such as customs duties, value-added taxes, land-use fees, withholding taxes on interest, royalties, dividends, stamp duties, or capital gains tax (Otto, 2018). Community development funds are emerging along with local content obligations. Figure 2.2 depicts the typical allocation of fiscal benefits between governments and investors.

¹ The IMF FARI model assumes a 5% royalty on gross sales, 30% CIT, and 10% free state equity. Two alternative regimes included in the model are an additional profits tax and a tax on rent.

Figure 2.2. Typical allocation of fiscal benefits between governments and investors



Source: Natural Resources Governance Institute, 2015.

2.2 Challenges to Revenue Collection Under the Current Mining Tax System

For many resource-rich developing countries, mineral resources present an unparalleled economic opportunity to increase government revenue and national economic activity. However, the reality is that most developing countries have struggled to fully realize the expected revenues from the sector due to a range of challenges, both external, such as aggressive tax planning by multinationals, and internal, including weak enforcement of tax laws and overly generous tax incentives.



The challenges to mining revenue collection are numerous. They range from policy to administrative issues. These challenges are outlined below based on the results of the government survey.

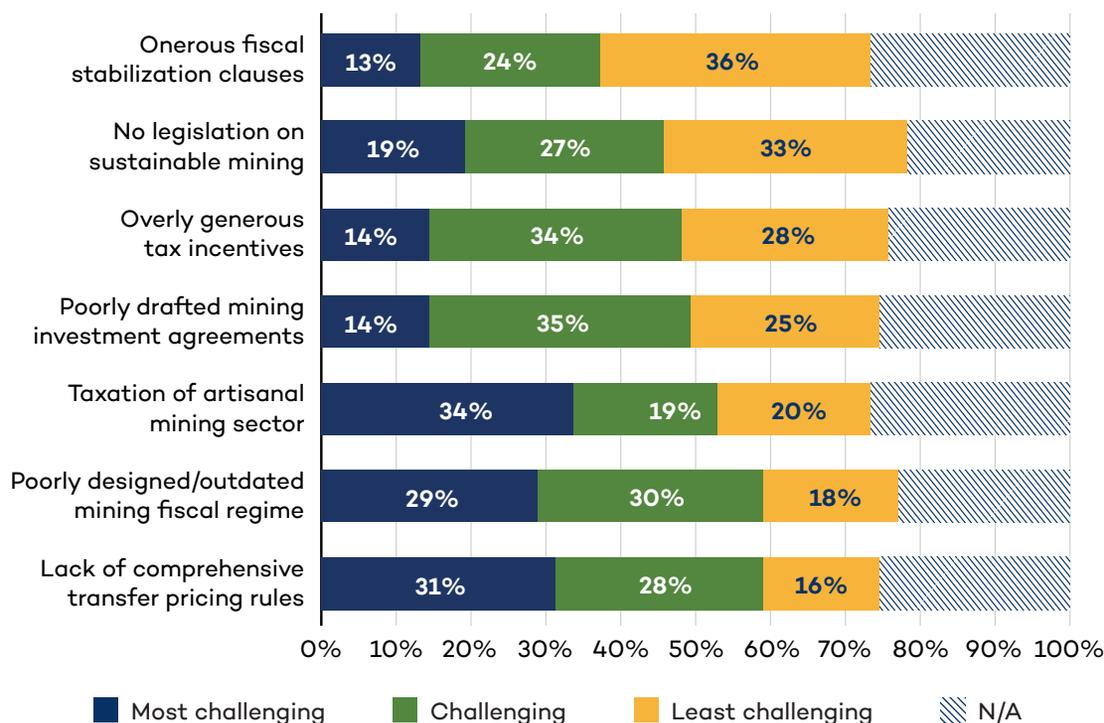
2.2.1 Gaps and Weaknesses in Mining Fiscal Policy Settings

The difficulty of taxing multinational companies—not only or even especially in the mining sector—is widely acknowledged as a challenge facing tax administrations globally. Inadequate laws and limited human and financial resources mean that developing countries, in particular, are poorly equipped to apply complex international tax norms, such as the arm’s-length principle (Ezenagu, 2010) and double tax treaties (Brooks & Krever, 2015), leaving them vulnerable to tax base erosion and profit shifting (BEPS), which the IMF estimates deprives African countries of up to USD 730 million in mining revenue per year (IMF, 2021). The survey confirmed this, with many countries citing inadequate transfer pricing rules as the main challenge to mining revenue collection (see Figure 2.3). Transfer pricing rules regulate how transactions between related parties should be valued and priced.

Many countries also confirmed that they are working with outdated mining fiscal regimes and poorly drafted mining investment agreements. Such agreements often contain fiscal incentives that further complicate mining revenue collection. While some governments may determine that efficient and effective tax incentives are necessary to induce mining investment, this often comes at a cost to tax administration and may result in unintended revenue losses (Readhead, 2018). Countries also identified fiscal stabilization clauses as an added challenge, as they are legal guarantees that may lock in poorly designed fiscal terms, leading to unsustainable benefits for investors and potentially resulting in costly disputes.

The taxation of artisanal and small-scale mining (ASM) was also identified as a key challenge. Generating substantial government revenue from ASM is a difficult task, given the informality of the industry and the need to leverage ASM for broad-based socio-economic development. Because ASM induces higher spending at the local level, focusing on indirect taxes and wealth taxes rather than extraction or export taxes may be more promising. If these taxes are reinvested locally to improve formalization and local service delivery, they can boost compliance levels and, ultimately, the government’s take from ASM.

Figure 2.3. Main policy challenges to mining revenue collection



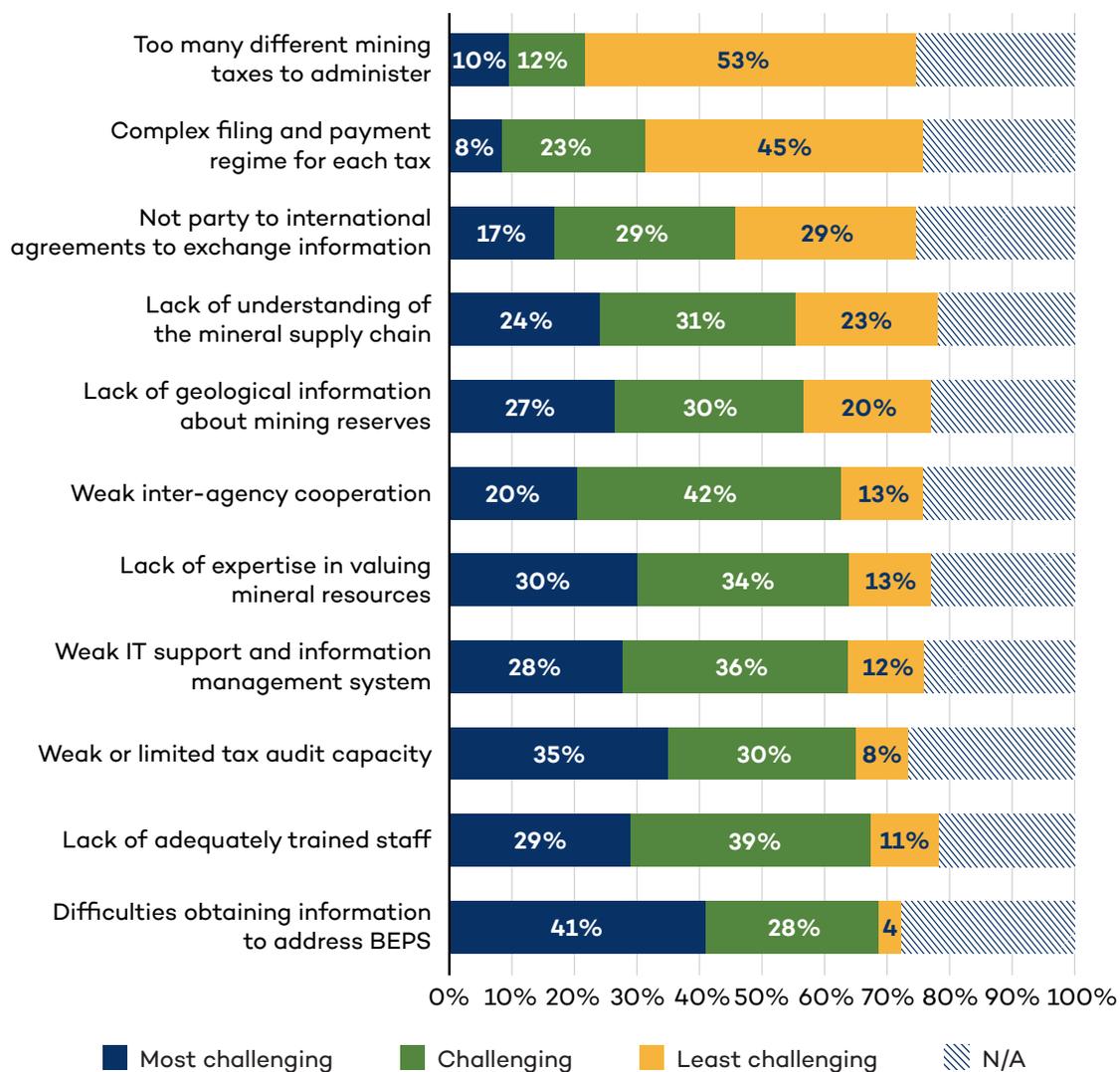
Source: Government survey

2.2.2 Implementation Challenges

Good mining fiscal policy settings are only useful to the extent that governments can implement them. Access to information and expertise are two major factors that impact mining tax administration. Information, particularly from other jurisdictions, is critical for tax administrations to identify and evaluate transactions in order to collect the correct amount of tax. There are various instruments to improve information exchange—including bilateral tax treaties, tax information exchange agreements, the Organisation for Economic Co-operation and Development Convention on Mutual Administrative Assistance in Tax Matters, and the African Tax Administration Forum Multilateral Agreement on Assistance in Tax Matters—but the process is still slow and time consuming for many developing countries (Global Forum on Transparency and Exchange of Information for Tax Purposes, 2014). Knowledge of the mining sector, as well as general tax audit capacity, are key challenges. The different government agencies involved in mining revenue collection may lack the capacity to verify the quantity and quality of mineral reserves and products. Inter-agency cooperation is also important to better regulate the industry and avoid following a siloed approach to achieve narrow objectives (Bocoum et al., 2013).



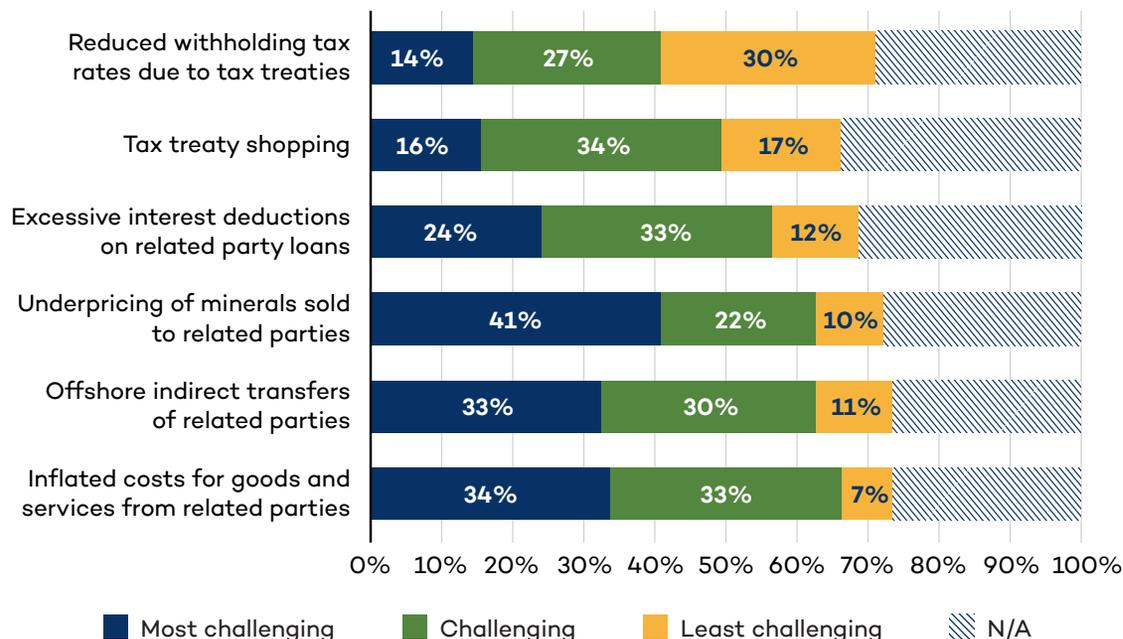
Figure 2.4. Main tax administration challenges to mining revenue collection.



Source: Government survey

Many of the BEPS risks in the mining sector mirror government capacity constraints—for instance, whether or not governments have the expertise to verify the cost of goods and services and the price of minerals (see Figure 2.5). Whereas financing and tax treaty issues are relatively generic, these other transactions require tax auditors to have detailed knowledge of the mining value chain, including different commodities. Inflated costs are a particular risk because of the scale of mining operations (Otto, 2018, p. 13). Valuing intangibles, such as intellectual property, is also becoming more relevant with the rise of automation and technology in the mining sector (Albertin et al., 2021). Taxing the sale of offshore indirect mining assets is another issue. Many countries lack rules to tax these transactions, often forgoing significant amounts of revenue (Platform for Collaboration on Tax, 2020).

Figure 2.5. Main tax BEPS challenges to mining revenue collection



Source: Government survey



2.3 Conclusion

Many resource-rich developing countries depend on the mining sector to deliver a significant share of government revenues. They rely on the unique system of mining taxation, which typically aims to collect as much revenue as possible subject to other policy goals. However, in many cases, mining has failed to deliver the expected revenues. Reasons for this include outdated legislation and investment agreements, overly generous tax incentives, and tax planning, to name a few. Some countries lack the expertise, information, and tools to effectively implement their mining tax system. Corruption and mismanagement of mining revenues remain a perennial challenge.

It is not all bad news, though. There has been some progress toward strengthening mining revenue collection. Many countries are updating their mining fiscal policy settings and strengthening their tax audit capacity. There are new standards that promote the more judicious use of fiscal stabilization clauses and the exchange of information between tax administrations. It is now a universal requirement that all countries that implement the Extractives Industries Transparency Initiative disclose mining, oil, and gas contracts, significantly increasing the transparency of fiscal terms, among others.

The question is whether these improvements are enough to address the significant domestic revenue mobilization needs of developing countries in a time frame that allows them to fully benefit from the renewed demand for minerals in the context of the energy transition. Some argue that the traditional mining fiscal regime, with its reliance on CIT, is unlikely to deliver the level of strong, sustained government revenue expected by theoretical models (Otto, 2018, p. 3). Going forward, resource-rich developing countries may need to explore new models of financial benefit sharing.

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Chapter 3.

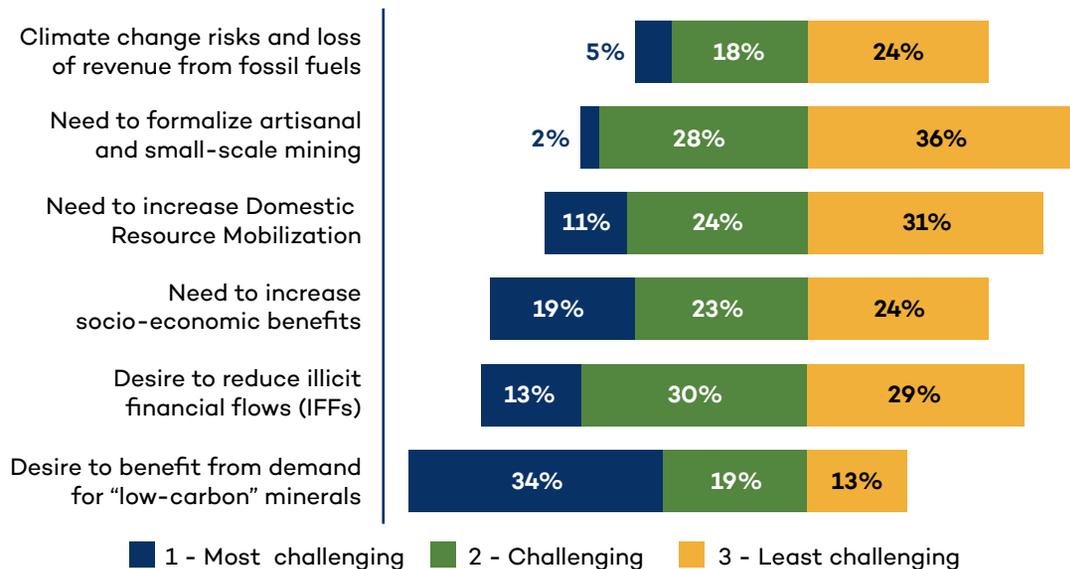
Mining at a Crossroads: Reasons to rethink mining taxation

3.1 Introduction

There are several reasons to rethink mining taxation. The main economic paradigm of 30 years ago, for developing countries especially, emphasized the role of fiscal policy in attracting (foreign) investment over collecting revenue. This paradigm has evolved, especially for location-specific industries like the extraction of raw materials. Fiscal policy still has a role to play in creating a sound environment for investments in mining projects, but policy-makers have a more nuanced understanding of what matters for investors and what types of investments and benefits lead to sustainable growth and development in the host state (Hund et al., 2020).

The extractive sector is also at the crossroads of several global phenomena: the impact of climate change and the impetus to green the world economy, the development of technologies affecting labour markets, a troubled post-COVID global economy, and global momentum in favour of tax reforms. These changes present new opportunities and risks for the sector's financial benefit-sharing model.

Figure 3.1. Government perceptions of the extent to which new opportunities and risks are motivating mining fiscal reform



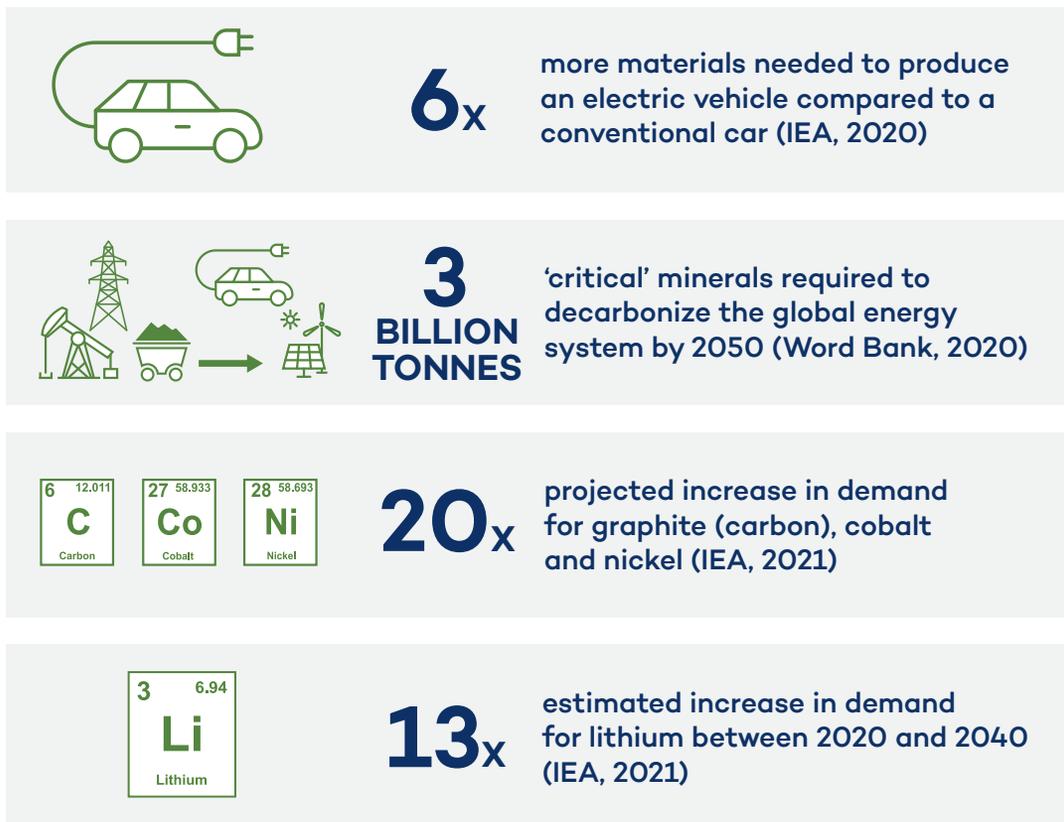
Source: Government survey.

3.2 Demand For Critical Minerals to Fuel the Energy Transition

Demand for critical minerals presents a second chance for countries to benefit financially from the mining boom. Prices for minerals like lithium and cobalt have more than doubled (Kim, 2022). However, the demand brings with it some uncertainty. The potential for future growth in government revenues depends on many factors. It is possible that recycling and the increasing push for circular economy policies will reduce the need for the primary extraction of some minerals in the next decades (Toledano et al., 2020, p. 2). Minerals such as copper and aluminum are easy to recycle without losing their potency. Recycling requires less energy than primary production. Changes in technologies—for example, the technology in batteries for energy storage—could also have major, and in some cases, still unforeseen, impacts on future demand for cobalt, lithium, and other battery components, and therefore on host countries and investors.



Figure 3.2. Increase in demand for critical minerals



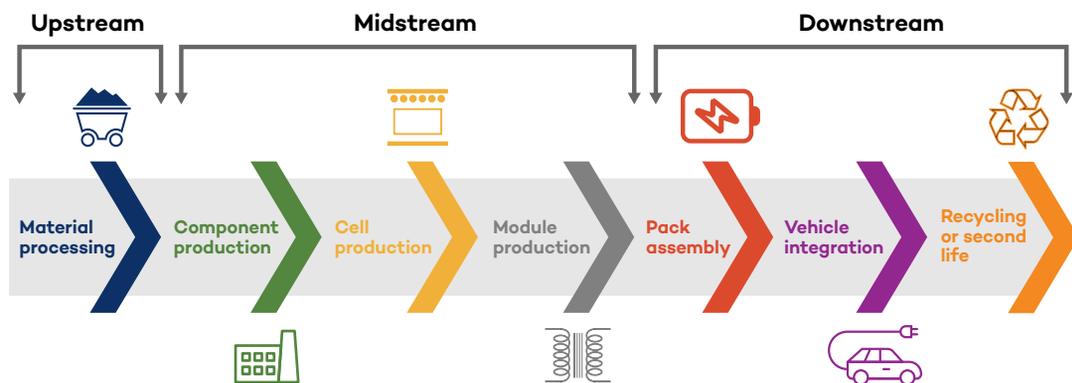
Source: Hendriwardani & Ramdoo, 2022; reprinted with permission.

There is a risk that countries will design fiscal policies to become too reliant on revenues from critical minerals, which are potentially less stable and predictable due to dynamic innovation in energy technologies. Another risk is that high mineral prices, scarcity of supply, governance gaps, and poorly designed fiscal policy in some jurisdictions may lead manufacturers to make huge investments in research and development to find substitutes (Zaremba, 2020). Mining regimes that chase prices and technologies have rarely been successful in maximizing government revenues over the longer term. Long-term fiscal policy, among other conditions, will be critical to ensuring that governments and citizens are best placed to maximize the value of potential growth in these commodities.

3.3 Renewed Opportunities for Local Value Addition

Countries have an opportunity to increase benefits from mining through value addition. Zambia, the sixth largest producer of copper, and the Democratic Republic of the Congo, which holds 70% of the global cobalt reserve, want to jointly manufacture electric batteries. Through this arrangement, both countries could see an increase in revenue from their mining sectors in addition to creating jobs (United Nations Economic Commission for Africa, 2022). The success of value addition will depend on proximity to the market, infrastructure, and the availability of other inputs, as well as an enabling fiscal environment. Figure 3.3 shows the battery supply chain.

Figure 3.3. The battery supply chain



Source: Ramdoo, 2022; reprinted with permission.

Countries are implementing fiscal measures to promote value addition. Zimbabwe recently banned the export of raw lithium (Africa News, 2023), while Indonesia banned the export of nickel ore (International Energy Agency, 2022) and introduced export taxes on its semi-processed metals (Reuters, 2017). Such restrictions will work if the country has all the other requirements for value addition mentioned above; otherwise, it could discourage investment. Well-designed fiscal policy is necessary to ensure that resource-rich countries make the most out of the potential for additional sources of revenue and new economic linkages from low-carbon minerals.



3.4 Climate Change

As the world slowly addresses climate change and shifts away from fossil fuels, countries that have traditionally depended on revenue from oil, gas, or coal will need to diversify their tax base. Countries with large state-owned companies will be most at risk of being left with stranded fossil fuel assets and large liabilities (Manley et al., 2017). Each government will assess its own options in terms of economic policy, but it is expected that those countries that have already invested human and financial resources in their extractive sectors, such as Saudi Arabia or Nigeria, may put a stronger focus on mining (Okechukwu & Arowosaiye, 2020; Oxford Business Group, 2017). Now more than ever, there is increased pressure on the mining sector to deliver revenues for the economies.

It is also clear that developing countries, which have little responsibility for global warming, will be particularly vulnerable to the impacts of climate change, from droughts, floods, hurricanes, and related climate events. Adapting to these risks and developing a resilient economy will require important financial resources to invest in new infrastructure and human capital (United Nations Environment Programme, 2016). These resources are already lacking. Governments will be seeking increased contributions and innovative financing wherever they can. They are entitled to expect the support of developed economies, which are responsible for most of the world's carbon emissions and the changing climate.

3.5 Disruptive Technologies Impact the Sharing of Mining Benefits

The mining sector is undergoing a major technological transition. From the use of autonomous long-haul trains and trucks to full digitalization of mine operations and the use of optimization tools like machine learning and artificial intelligence, the sector is experiencing rapid transformation. The suite of new technologies available and emerging will revolutionize the way mining is conducted in many instances. On the one hand, these changes bring new opportunities, including the increased viability of operations in the face of declining ore grades, increased worker health and safety, lower greenhouse gas emissions, and more opportunities for women in the workplace (Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development, 2019, p. 5). Additionally, new technologies might also mean opportunities to improve government oversight of the mining sector. The digitalization of operations will mean that mine sites are rich with real-time data. Increased access to information may also facilitate the implementation of more nuanced, targeted fiscal terms.

On the other hand, the adoption of some new technologies may substantially change the traditional benefit-sharing model of the mining industry in both developed and developing countries, with the impacts of that change being felt more acutely in developing countries. Technology is likely to replace significant numbers of low- and medium-skilled workers in the countries where they are deployed (Cosbey et al., 2016, p. 27). This will not only impact livelihoods but also means fewer payroll taxes and indirect taxes derived from economic activities around the mine, which currently make up a large share of payments to governments. Technologies will lead to a significant increase in the value of mining-related intangible assets, such as patents, algorithms, etc., as a percentage of the mining value chain. Intangible assets already represent a major profit-shifting risk for multinational companies.

3.6 A Deepening Debt Crisis for Many Developing Countries

Most developing country governments are financially strained in the aftermath of the COVID-19 pandemic. Countries have spent money to face the pandemic, to protect their businesses and their workers, and to build back their economies. Additionally, countries have been grappling with the high cost of living, food, and energy inflation, which are in part due to the war in Ukraine (Mensah, 2022). Developing countries are facing increasing interest payments on dollar-denominated debt as the Federal Reserve and other central banks around the world tighten financing conditions to fight inflation (Peralta-Alva & Mishra, 2023). Many countries are now highly indebted, which affects their macro-fiscal stability (World Bank, 2023). Countries are looking to their most productive sectors, such as mining, to deliver much-needed revenues.



3.7 A Changing International Tax Landscape

The Organisation for Economic Co-operation and Development (OECD)/G20 Inclusive Framework on Base Erosion and Profit Shifting recently introduced a global minimum tax of 15% (OECD, 2023). Tax incentives can reduce annual effective tax rates for multinational companies for many years to below the prescribed minimum rate of 15%. A multinational company in scope of the minimum tax with an effective tax rate under 15% in a specific country in a year may have to pay the difference to the tax authority of another country—either its headquarter country or another country where it has operations. In response, mining countries may need to make changes in their fiscal regime. Some may need to remove profit-based tax incentives that reduce effective tax rates below 15% and have become ineffective. Others may want to introduce a domestic minimum tax to ensure an even 15% effective tax rate for all investors (Christians et al., 2022).

The two-pillar solution agreed upon by the OECD/G20 Inclusive Framework on Base Erosion and Profit Shifting has opened up possibilities. Although many countries are not satisfied with its outcome, it is now clear that international tax rules can be reformed. Many governments are proposing further changes and encouraging new leadership on international tax by the United Nations (African Tax Administration Forum, 2022). This opens up possibilities for developing countries to shape international and domestic tax rules that better serve their interests (Isaac, 2022).

3.8 Conclusion

The basic mineral sector taxation tools have remained the same over the past several decades. However, the industry, and society, are changing. In particular, the demand for critical minerals to fuel the energy transition presents a unique opportunity for resource-rich countries, especially developing countries, to re-imagine their mining sector, including how they benefit financially. Expectations are high considering the financial pressures to build back economies post-COVID, fight inflation, avert a deepening debt crisis, provide energy security while diversifying away from fossil fuel, and address potential job losses from automation.

Resource-rich developing countries need more fiscal approaches and tools to choose from to face these emerging trends. They require a menu of innovative, forward-looking policy ideas that will improve mining revenue collection and a framework to think through and evaluate these options. None of the ideas in this handbook is a silver bullet to address all the old challenges and new risks and opportunities that the mining sector faces. But what they demonstrate is that there are different ways of collecting a share of mineral rents—which some countries are already implementing—that could improve the current mining tax system in some contexts. Each of these ideas is interesting on its own, and together they could encourage even more innovation from policy-makers, academics, experts, and civil society organizations to face the challenges of this century.

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Chapter 4.

Measuring Success: Frameworks and tools for designing and evaluating mining fiscal policy reforms

4.1 Defining Success for the Mining Sector for Resource-Rich Developing Countries

A government should evaluate mining fiscal policy in terms of how it contributes to achieving its overarching vision and ambitions for the sector. As this handbook demonstrates, there are many ways that governments can benefit financially from mining. The precise choice and mix of fiscal approaches and tools will depend on where government comes down on the trade-offs between different policy objectives and what they want to achieve from the sector overall.

For the African Mining Vision (AMV) (African Union, 2009), the aim of the mining sector should be to deliver “transparent, equitable and optimal exploitation of mineral resources to underpin broad-based sustainable growth and sustainable development” (p. v). Revenues, if properly invested, are an important objective of natural resource management. Other objectives include local procurement of goods and services, supporting the development of local suppliers, creating local employment, developing skills through education and training, and building or improving local infrastructure and logistics networks. Value addition is at the heart of the AMV, with Africa having historically exported predominantly unprocessed minerals. Many countries are looking to develop supply chains for critical minerals. This objective has taken on greater importance in the energy transition era. Leveraging these broader socio-economic benefits of mining is considered an important way of avoiding the “resource curse.”

Many of the aims and objectives of the AMV are reiterated in other mining policy frameworks and resource management tools. The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development Mineral Policy Framework (2013) emphasizes the role of mining in contributing to sustainable development and poverty reduction in producing countries. Similarly, the *Natural Resource Charter* guides governments along the various policy decisions required to transform their extractive wealth into sustained prosperity (Natural Resource Governance Institute [NRGI], 2014). The Extractive Industry Transparency Initiative (2019) also measures success in terms of mining's ability to produce sustainable economic growth that contributes to sustainable development and poverty reduction. It cautions that if it is not managed properly, mining can do more harm than good.

Revenue has an important role to play in delivering the mining for sustainable development agenda. Some argue that revenue is the primary benefit of resource extraction (Daniel et al., 2017, p. 80). Unlike other export-oriented industries, resource projects typically operate as “enclaves” with few inter-industry linkages (Auty, 2006). This quality is due to mine sites generally being remote and because it has often been uneconomic to carry out significant downstream processing in-country due to a lack of reliable access to power and other enabling infrastructure. The number of low-skilled jobs at the mine site is also limited and dropping as a result of automation (Cosbey et al., 2016, p. 27). With these other benefits potentially diminishing, fiscal policy settings—and the resulting revenues—are likely to be even more important going forward.

But even so, domestic revenue mobilization is only a means to an end. The goal is extractives-led sustainable development, and this should be the yardstick by which the policy ideas contained in this handbook are measured. For some countries, this might make certain ideas more attractive—for example, taking a share of production in lieu of taxes to enable downstream linkages into mineral beneficiation and manufacturing. For others, it might necessitate trade-offs, reducing existing taxes to accommodate a new tax on turnover to benefit communities. The handbook aims to offer a menu of options for governments to choose from, depending on the local context and vision for the sector.

All stakeholders have a role to play in ensuring that mining contributes to sustainable development. Governments are responsible for creating and implementing a strong legal and governance framework to regulate and monitor the sector. The fiscal regime is part of this, balancing the goal of maximizing government revenues, subject to other policy preferences, with providing an attractive return for investors. Revenues must be equitably distributed, including to host communities. And investors are expected to conduct their operations in accordance with the law and international best practices.



4.2 Principles for Designing and Measuring Mining Fiscal Regimes

The *Natural Resource Charter* (NRGI, 2014) states that the goal of mining fiscal policy and contractual terms should be to “enable the government to realize the full value of its resources consistent with attracting necessary investment and be robust to changing circumstances” (p. 17). In other words, the government’s goal should be to collect as *much revenue as possible* from the extraction of its natural resources as is compatible with the desired rate of investment. The fiscal regime should be flexible enough to achieve this goal across different projects and profitability levels.

Several organizations, most notably the International Monetary Fund (IMF; Daniel et al., 2010, p. 190–194), have provided a set of principles to guide governments in designing and evaluating mining fiscal regimes. Policy-makers should use these principles to assess the ideas in the handbook.

- **Simplicity.** A simple fiscal regime is easy to understand, communicate, and administer for both the taxpayers and the government administration. It can help formalize the industry. The drawback of a simple fiscal regime is that it may not be perfectly adapted to every single mineral project and would either limit investments in marginal projects or insufficiently tax very profitable investments.
- **Timing of revenues.** Governments may have different time preferences with respect to revenue collection. Developing countries are likely to prefer tax instruments that bring revenues forward, even if this means less revenue overall. A royalty, for example, will ensure that government starts receiving revenue as soon as production starts. The disadvantage is that a royalty will lower the “cut-off grade,” after which it is no longer economical to mine the deposit, potentially leaving valuable minerals in the ground.
- **Neutrality.** A neutral fiscal regime does not affect the timing or pace of extraction or re-investment. Most taxes, royalties, and other payments to the government impose a cost on investments that affects investment decisions. Each country finds the right balance depending on its policy objectives. It is important to understand which parts of the fiscal regime have more or fewer impacts on investments to strengthen reliable revenue sources while lowering the barrier to investment.
- **Adaptability (also called progressivity).** An adaptable fiscal regime is one that adjusts according to the profitability of mining projects. An adaptable fiscal regime is often seen favourably by investors, as it lowers the hurdle rate for mining projects. It can also offer better long-term revenue prospects to governments, but it comes at the cost of short-term and stable revenues. Countries might want to strike a balance in terms of the adaptability versus the reliability of mining revenues.

- **Stability** is important for investors, who often commit important capital expenditures to mining projects that will take years to recoup. Stability could be offered through dedicated stabilization clauses in mining contracts, but in recent years the international practice has shifted. Governments can offer stability more credibly by adopting clear, simple, and mutually beneficial fiscal terms and consulting mining companies prior to any meaningful change in the law or regulations.
- **Robustness to profit shifting** can be achieved both by designing a fiscal regime appropriate to a country's level of administrative capability and by adopting measures against base erosion and profit shifting in income tax law and international tax instruments. Mining fiscal regimes will be more robust against tax avoidance if they are composed of realistic taxes and royalties, easily applicable and enforceable, and incentivize compliance.

These principles are a useful way to evaluate the ideas in this handbook and navigate the trade-offs. Some ideas deliver early revenues, which may be important for resource-constrained governments, but raise the cost of investment, reducing the total amount of revenue over the life of a project. Other ideas might be simple to implement and more robust to profit shifting but distort investment decisions. Yet others may be more complex to administer but could maximize government revenue in the long term. Each government will differ with respect to the trade-offs they are willing to make. But by using this framework, policy-makers have a transparent and objective way to assess the policy ideas and a common language to articulate and justify their choices to other stakeholders.

4.3 Using Financial Modelling to Assess the Quantitative Impact of Different Fiscal Policies

Financial models are representations of the real world intended to give useful insight. They can be used to help governments make better-informed policy choices, such as which ideas to adopt from this handbook, given the expected impacts on government revenues and investor returns.

The IMF uses an Excel-based model—the Fiscal Analysis of Resource Industries (FARI) (IMF, 2022)—to evaluate extractive industry fiscal regimes. Other modelling practitioners in the non-profit sector include the Columbia Center on Sustainable Investment, International Institute for Sustainable Development, NRGi, and the Overseas Development Institute.



OpenOil has developed an open-source approach to the financial modelling of extractive industry projects and has published models of projects in Latin America, Africa, and Asia (OpenOil, 2019) (see Box 4.2 for additional practical tools used to assess a fiscal regime design).

Governments should use these and other publicly available or in-house models to quantitatively assess the ideas in this handbook and their mining fiscal regime more generally. This will enable policy-makers to compare different ideas across key metrics, such as the average effective tax rate (or government take) and the investor rate of return (see Box 4.1). The model should incorporate different mineral price and cost scenarios to see how the results vary depending on profitability. It could also compare the fiscal regime with other countries in the region or with countries that produce the same minerals to assess competitiveness.

Box 4.1. Key metrics for comparing the quantitative impact of mining fiscal policies

- **Investor net present value (NPV)** – A measure of the post-tax profitability of a project calculated as the present value of revenues minus the present value of costs and payments to the government. A discount rate (representing the investor’s cost of capital, the minimum required return on investment) is used to convert future cash flows into present values. A positive NPV means that a project is commercially viable for investors after deducting all government revenues.
- **Post-tax internal rate of return** – A project’s return on investment after taxes, which shows how commercially attractive the mining project is to investors seeking financial returns. An internal rate of return above the discount rate means a project is commercially viable.
- **Average effective tax rate or government take** – This is the government’s share of the total pre-tax net cash flows of a project. It is calculated over the entire life cycle of a project using the present value of future estimated cash flows.
- **Marginal effective tax rate** – This is a measure of the burden the fiscal regime places on a “marginal project” (i.e., a project that is only just financially viable [NPV = 0]) and indicates the extent to which the fiscal regime could deter investment at the margin.
- **Breakeven price** – This is the minimum mineral price required for the project to be commercially viable after tax. A lower breakeven price means a project would be more resistant to a drop in prices or profitability and is therefore a better investment proposition. It can be useful to assess how the design of a fiscal regime affects the breakeven price.

The handbook considers each policy idea in isolation. However, in reality, no one idea can be considered in isolation as it is the combined impact of the various fiscal settings that will affect investment and government revenue. Consequently, fiscal regime design requires that all the taxes and charges that fall on mining investors be considered as a package. A financial model is a tool to better understand the cumulative impact of the whole fiscal regime on the sharing of financial benefits between the host state and investors. It is also a way to know how different fiscal approaches and tools might interact to reinforce or potentially undermine government policy objectives. Taking an equity stake in a project might require the government to concede more immediate taxes, undermining the goal of early revenues, for instance. Financial modelling helps to identify and quantify these potential trade-offs.

Financial modelling can also help policy-makers understand the differential impacts of fiscal policies on mining projects. Some projects will have more economic rent available to tax than others, making it easier or harder to absorb a higher level of taxation. High rents might be a function of low costs, high prices, or both. Modelling the ideas in this handbook across a range of profitability scenarios will show the differential impact of certain policies on mining projects. Some ideas may be better suited to specific projects or minerals, as well as specific political and economic contexts.

Finally, many of the ideas in this handbook can be designed—in theory—to give the government the same share of revenues over the life cycle of a project with a given set of economic assumptions. In practice, however, this equivalence may break down depending on the administrative capacity of host governments and the vulnerability of certain taxes to profit shifting. This means that although certain policies might be theoretically economically equivalent, they deliver different results in practice.

Box 4.2. Practical tools for mining fiscal regime design

1. Financial modelling

Financial modelling standards

- Flexible, Appropriate, Structured and Transparent (FAST): A set of rules providing guidance on the structure and design of efficient spreadsheets, maintained by the FAST Standard Organisation (n.d.).
- Best Practice Spreadsheet Modelling: An off-the-shelf corporate policy document developed and maintained by the Spreadsheet Standards Review Board (Best Practice Modelling, n.d.).
- SMART: A best-practice methodology for financial forecasting and scenario analysis developed by Corality (Texas Tech University, 2023).

There are various financial models of mining projects in the public domain:

- FARI model (IMF, 2022)
- Gold benchmarking model (Columbia Center on Sustainable Investment, 2023)
- Mongolia Macro-fiscal Model (Mihalyi et al., 2017)
- Library of FAST-compliant project models (OpenOil, 2019)

For further guidance on the basics of financial modelling, see:

- FARI Technical Note and Manual (IMF, 2022)
- OpenOil's standardized open-source approach to financial modelling (OpenOil, 2019)
- Financial Modelling Handbook (crowdsourced) (Financial Modelling Handbook, 2023)
- Financial Modelling Courses (F1F9, 2023)

2. Databases that include fiscal laws and contractual terms

- **African Mining Legislation Atlas:** This is a database of African mining legislation from 53 African countries. The database can be used to compare fiscal terms, among others (African Mining Legislation Atlas, n.d).
- **Fiscalite des Industries Minières (FERDI) database:** FERDI provides a database of tax legislation and tax systems that apply to industrial gold mines in more than 20 African countries (FERDI, n.d).
- **Resource contracts:** The NRGi coordinates ResourceContracts.org, a repository of publicly available oil, gas, and mining contracts in a machine-readable, searchable, open-data format (Resource Contracts, 2015).

4.4 Conclusion

Governments have several avenues by which they can benefit financially from their mineral wealth. The right policy approach and set of fiscal instruments will depend on a range of factors, starting from a country's vision and ambitions for its mining sector, all the way down to its administrative capacity. There is no one-size-fits-all policy, which is why this handbook presents a menu of options for countries to choose from. Most will use a mix of approaches and instruments to balance their various objectives. Complex trade-offs may be required to balance the interests of a government and its investors. Having a clear framework and tools to select the most appropriate policies and evaluate the extent to which they achieve governments' goals is central to informed and transparent mining fiscal regime design.

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Chapter 5. A Minimum Profit Share for Government: As good as it sounds?

Thomas Scurfield, Natural Resource Governance Institute, with input from ministries of mines in Ecuador and the Philippines and support from IGF and ATAF

5.1 Introduction

There are now several fiscal regimes across the world that require the government to receive a specified share of the profits that a mine generates. These regimes are still based on the payment of royalties and corporate income tax, but they require additional payment if the government share of profits is below the stipulated threshold. This threshold is 50% or higher for the regimes that have been identified as having this feature.

Each country has a unique approach to setting the government's share of profits. This policy paper evaluates the regimes in Tanzania, the Philippines, and Ecuador, exploring whether they represent an improvement on the dominant fiscal regime for mining and if they offer a template that other countries can follow. The analysis uses an economic model developed for this purpose (Natural Resource Governance Institute, 2023).

5.2 The Regimes in Tanzania, the Philippines, and Ecuador

5.2.1 Tanzania's Approach

Amid public frustration about Tanzania's mining deals, the government and Barrick Gold renegotiated mineral development agreements (MDAs) for three of the country's key gold mines in 2019. The renegotiated deals provide for a 50/50 share of the "economic benefits" (Acacia Mining PLC, 2019). Since then, the government has entered a 55/45 sharing arrangement with Petra Diamonds for Tanzania's only large-scale diamond mine,

with the government receiving the larger share (Jamasmie, 2021). While these mines are already producing, the government also appears to be following this sharing approach in deals for at least one new project. Discussions with officials suggest that the government is seeking a share of more than 50% in these deals.²

This sharing mechanism is not currently set out in the legal framework for the mining sector, and the Barrick Gold MDAs and agreements for other projects have not been disclosed. This analysis is therefore based on the published framework agreement between the government and Barrick Gold that informed the MDAs and discussions with government and industry officials.³ While this means the analysis focuses on the 50/50 arrangement, the implications of a different split, such as the 55/45 agreed with Petra Diamonds, are also discussed. The three key elements of the sharing mechanism are set out below.

Definition of economic benefits. Although “economic benefits” are not defined in the framework agreement, discussions with government and industry officials suggest that they comprise government revenue streams (except for value-added tax [VAT]),⁴ shareholder dividends, and any remaining profit not distributed as dividends. These benefits are calculated on a cumulative basis from the start of a mine’s operations (i.e., from the start of the licence period). By the end of a typical mine’s lifetime, its economic benefits should be broadly equivalent to its total profit. Discussions with officials suggest that cumulation is based on actual—not discounted—cash flow and therefore does not account for the time value of money.

Trigger for sharing mechanism. Sharing is triggered once cumulative, post-tax cash flow is positive, meaning that all exploration and development costs have been recouped. Discussions with officials suggest that the timing of this trigger is set in advance using the mine life plan rather than being based on actual performance.

Sharing mechanism. The investor pays the taxes set out in the fiscal regime, such as royalties and corporate income tax, in line with the typical approach. However, after the sharing trigger, if one party’s cumulative share from the start of the mine’s operations is greater than 50% at the end of a year, it must pay the other party the amount required to rebalance. Discussions with officials suggest that this payment could be made at that point in time or, if the investor has overpaid, treated as an advance payment of future taxes.

² The largest mine in the pipeline—Kabanga, which will produce nickel and cobalt—has signed a framework agreement with the government that provides for economic benefits to be “equitably shared” (Kabanga Nickel Limited, 2021).

³ This framework agreement was made public in a document setting out Barrick Gold’s offer to buy the shares it did not already own in Acacia Mining, the previous owner of the Bulyanhulu, Buzwagi, and North Mara mines in Tanzania (Acacia Mining PLC, 2019).

⁴ The main revenue streams are licence fees, import duties, skills development levies, royalties, export clearance fees, corporate income taxes, interest-withholding taxes, dividend withholding taxes, and a share of dividends and loan repayments through state equity. The Barrick framework agreement only provides for a government share of shareholder loan repayments (Acacia Mining PLC, 2019), but the Mining (State Participation) Regulations 2020 provide for a share of repayments of any related or unrelated party loans.

5.2.2 The Philippines' Approach

The Philippine regime requires mines that operate under a Financial or Technical Assistance Agreement (FTAA) to provide a government share of at least 50% of annual “net mining revenue” after a cost-recovery period (Republic of the Philippines, n.d.).⁵ There are currently seven projects with FTAAAs.

This mechanism is primarily set out in a publicly available model FTAA (Republic of the Philippines, n.d.). The FTAA for a given project is subject to negotiations and therefore may differ slightly from this template.⁶ The focus here is on the regime set out in the model FTAA.

Definition of net mining revenue. Net mining revenue is sales revenue (net of transport and processing charges) minus deductible expenses in a given year. Deductible expenses include, among other things, development costs after the start of production, operating costs, interest payments, and royalties.

Trigger for sharing mechanism. The sharing mechanism is triggered at the end of the “recovery period.” The recovery period ends the earlier of 5 years from the start of production or the point at which all pre-production expenses have been recouped. The timing of this trigger is based on the actual performance of a mine rather than set in advance.

Sharing mechanism. The investor pays the “basic government share” throughout the project’s lifetime. However, the composition of this basic government share up to the end of the recovery period and after the recovery period differs. A comprehensive list of the taxes included in the government share during these two periods can be found in the model FTAA and applicable legislation, but the main components up to the end of the recovery period include an excise tax, royalties, and a local business tax. The basic government share after the recovery period includes these taxes, as well as import duties, corporate income tax, and withholding taxes on interest and dividends.

After the end of the recovery period, if the basic government share is less than 50% of net mining revenue in a given year, an “additional government share” must be paid by the investor to increase the total government share to 50% of net mining revenue. However, if the basic government share is more than 50% of net mining revenue, the government does not have to compensate the investor. In other words, the mechanism acts as a floor but not a ceiling on the government’s share.

⁵ Any mine licensed to a foreign company must have an FTAA.

⁶ For example, some terms in the original FTAA for an Oceana Gold mine (Republic of the Philippines, 1994) differed in some areas. (The recently signed extension to this FTAA has slightly different terms again.)

5.2.3 Ecuador's Approach

The Ecuadorian regime requires mines to provide a government share of at least 50% of “accumulated benefits.” This requirement is established in the country's constitution (Constitutional Court of Ecuador, 2022). It is primarily set out in the general regulations of the mining law (Government of Ecuador, 2019).

Definition of accumulated benefits. “Accumulated benefits” are the sum of the government revenues specified in the regulations and any free cash flow available to the investor.⁷ These benefits are calculated on a cumulative basis from the start of a mine's operations (though the applicable government revenue streams are only payable from the start of production). Unlike Tanzania's approach, this calculation accounts for the time value of money. Cash flows are discounted to reflect that the earlier they occur, the more they are worth to either party.⁸

Trigger for sharing mechanism. Sharing is triggered once cumulative, discounted free cash flow is positive. At this point, the investor has recouped all exploration and development costs and earned its minimum required rate of return. The provision for the investor to earn its required return before sharing is triggered means the mechanism shares some similarities to an R-based cash flow tax, commonly referred to as a Brown tax (Broadway & Keen, 2010).

Sharing mechanism. The investor pays the taxes set out in the fiscal regime in line with the typical approach. After the sharing trigger, if cumulative government revenues are less than 50% of accumulated benefits at the end of the year, the investor must pay a “sovereign adjustment” to increase the government share to 50%. However, if government revenues are more than 50% of accumulated benefits, the government does not have to compensate the investor. In other words, like the Philippines' approach, the mechanism acts as a floor but not a ceiling on the government's share.

⁷ These government revenue streams are VAT, royalties, and corporate income taxes. The regime also includes a share of pre-tax profits that is currently divided between the company's workers and the government, with the portion that is received by the government included in its accumulated benefits. However, a recent court ruling means that all this labour profit share will go to workers from the start of 2024 (Constitutional Court of Ecuador, 2022). This analysis focuses on this new arrangement, which means that none of the labour profit share is included in government benefits.

⁸ The discount rate that is used is specific to a mine and is based on its weighted average cost of capital. This analysis assumes the weighted average cost of capital is around 7% in real terms, based on an interest rate on debt of 6%, a cost of equity of 8%, and a debt-to-equity ratio of 50:50.

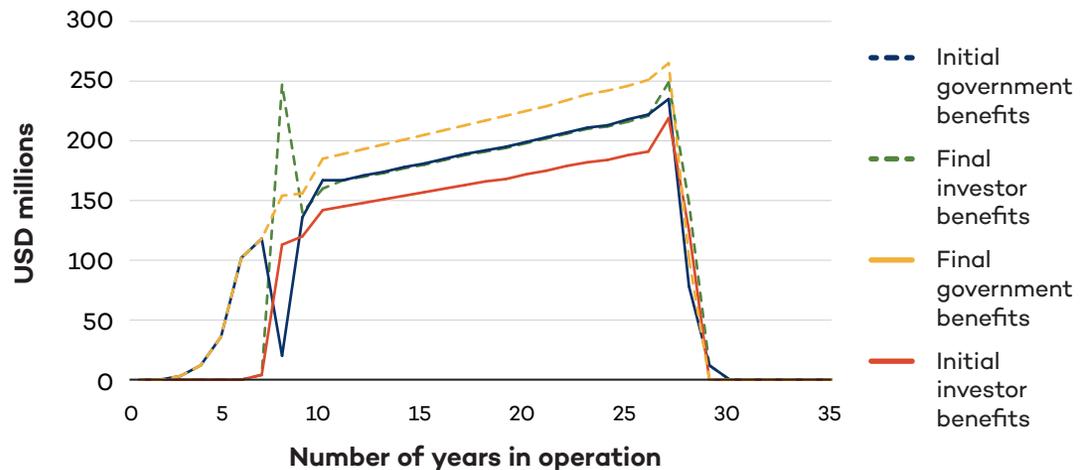
5.2.4 Modelling How the Three Approaches Work in Practice

The Tanzanian, Philippine, and Ecuadorian approaches were modelled for a gold mine of average profitability using a gold price of USD 1,600 per ounce, which is around the 10-year average (World Bank, 2022). In the figures below, “initial government benefits” are the revenues that the government would have received without the sharing mechanism, and “final government benefits” are the revenues that it ultimately receives after any rebalancing.

Tanzania

As Figure 5.1 shows, the government receives benefits from the mine prior to the sharing trigger as a result of input taxes, royalties, and some corporate income tax payments. Sharing is triggered in year 7 of the project’s life. The government will have a cumulative share that is significantly greater than 50% at this point. It therefore must make a payment to the investor or forgo future tax payments to rebalance. The latter option is modelled, given it will probably be politically difficult for the government to make a direct payment to the investor; the implications of the two options are discussed later in this policy paper. Following this initial rebalancing, the fiscal regime continues to generate a larger initial share of the benefits for the government than for the investor. The government therefore continues to forgo a portion of future tax payments to rebalance.

Figure 5.1. Tanzania’s sharing of benefits across the lifetime of a gold mine making average profits⁹



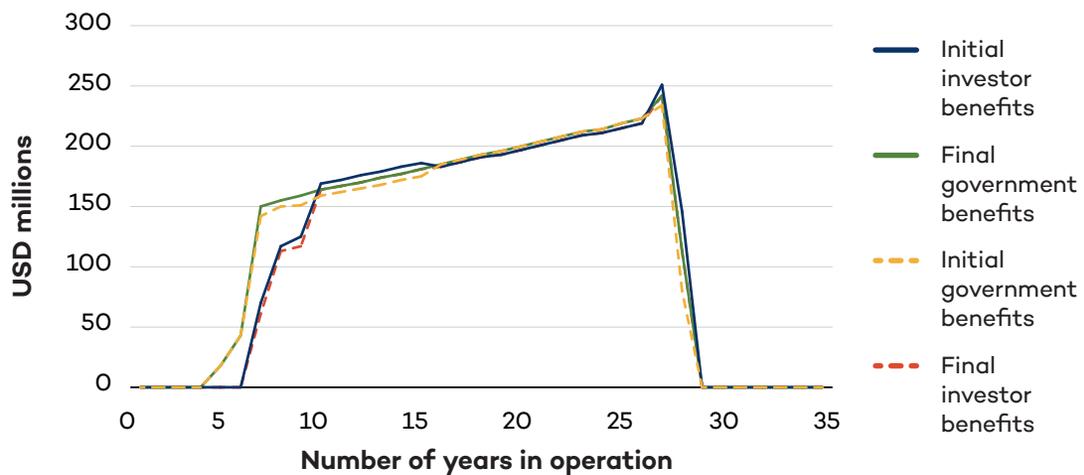
Source: Author, based on modelling.

⁹ With a gold price of USD 1,600 per ounce.

The Philippines

As Figure 5.2 shows, the recovery period ends after 3 years of production, in year 7 of the project's life. Because the government's basic government share is less than 50% of net mining revenue at this point until year 16, the investor pays an additional government share. For the following few years, the basic government share is at least 50% of net mining revenue. This means that the investor does not make any additional payments. However, unlike Tanzania's approach, the government does not have to compensate the investor for receiving more than 50% of net mining revenue.

Figure 5.2. The Philippines' sharing of benefits across the lifetime of a gold mine making average profits¹⁰



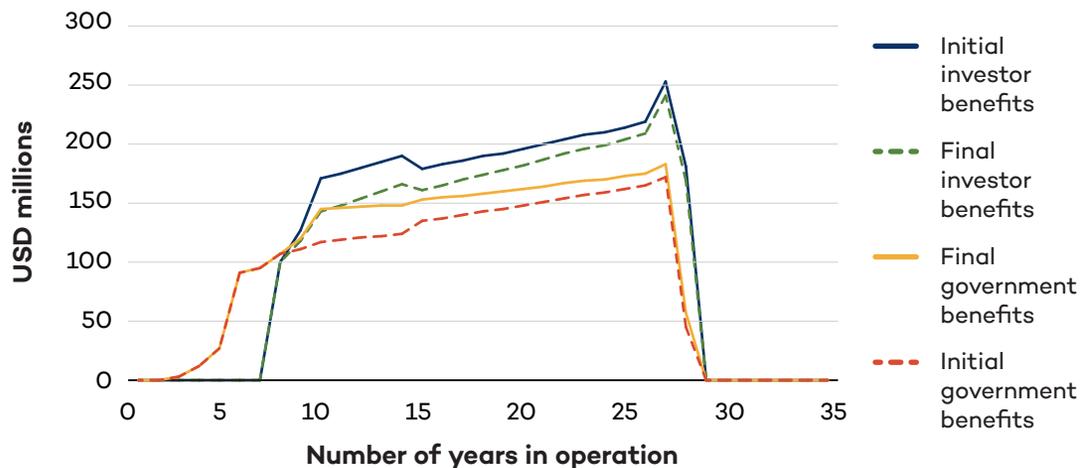
Source: Author, based on modelling.

Ecuador

As Figure 5.3 shows, sharing is triggered in year 8 of the project's life. This is a year later than in Tanzania's approach because the investor is permitted to earn its required return before sharing. From this point onward, annual investor returns are significantly greater than government revenues. Therefore, despite the government having received revenues in previous years, its share of cumulative benefits falls below 50%, and the investor makes an additional payment. However, these payments do not result in the government and the investor receiving the same monetary amount each year. Sharing is based on discounted cash flow. The revenue that the government received in the early years of the mine is worth more than the same monetary amount received by the investor later. This reduces the size of the additional payments that the investor needs to make for cumulative benefits to be shared equally.

¹⁰ With a gold price of USD 1,600 per ounce.

Figure 5.3. Ecuador’s sharing of benefits across the lifetime of a gold mine making average profits¹¹



Source: Author, based on modelling.

5.3 An Assessment of the Three Regimes

The Tanzania, Philippines, and Ecuador approaches were reviewed against the typical objectives of a fiscal regime: maximizing government revenue without deterring investment, balancing reliable revenues with flexibility as profits change (often referred to as progressivity), and focusing on simplicity to limit tax avoidance risks. Political economy implications were also considered.

In the analysis of the regimes’ performance in relation to a gold mine, to isolate the effect of the sharing mechanism, the performance of the regimes was compared with and without it. Tanzania, the Philippines, and Ecuador compete with other countries for investment; therefore, their regimes were also compared with those of some of the world’s other gold producers.

¹¹ With a gold price of USD 1,600 per ounce. The model assumes that all the labour profit share goes to workers in line with the recent court ruling, and therefore none is included in government benefits.

5.3.1 Government Take With Average Profitability

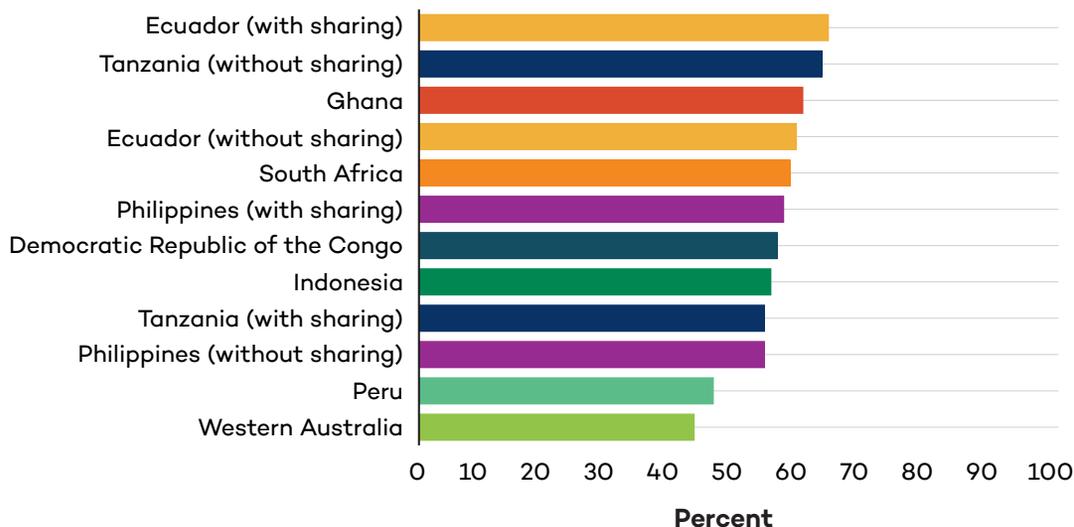
As Figure 5.4 shows, the sharing mechanism affects the government take in the Tanzanian, Philippine, and Ecuadorian regimes in different ways.

The Philippines' and Ecuador's mechanisms both increase the government take from a mine with average profitability compared to the regimes that would otherwise be applicable. However, Ecuador's mechanism has a larger impact, despite two features (highlighted in Section 5.2.3) that would be expected to have a smaller impact than the Philippines' mechanism. First, the investor is able to earn its required return before sharing. Second, sharing is based on a cumulative rather than annual benefit, and therefore the revenues that the government earns early in the mine's life count toward its share later in the mine's life. Ecuador's mechanism has a larger impact because several significant taxes—such as import duties and withholding taxes on interest and dividends—do not count toward the government's share of benefits. The exclusion of these taxes increases the additional payment that the investor must make for the government to receive 50% of cumulative benefits.

Tanzania's mechanism, in contrast, reduces the government take because of the ceiling that it imposes on the government's share of benefits. However, it still generates an average effective tax rate (AETR) greater than 50% (with a discount of 10%) because the 50/50 split is based on actual cash flow. Given that the government receives revenue before the investor, the government receives a larger share on a discounted basis.

Whether the three regimes strike a reasonable balance between generating government revenue and competitiveness for a mine with average profitability will depend on the wider investment climate of these countries, which is outside the scope of this analysis. For example, Ecuador's government take is higher than the other countries analyzed, but the country may have more predictable policies or better infrastructure.

Figure 5.4. AETR for an average gold mine with a gold price of USD 1,600 per ounce¹²



Source: Author, based on modelling.

5.3.2 Reliability Versus Flexibility

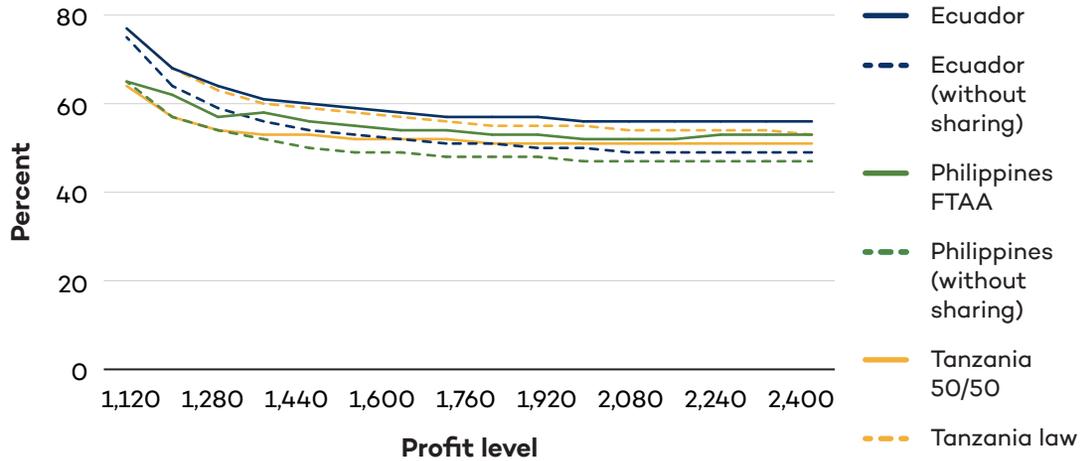
Many governments want a regime that generates some revenue for their budget each year, irrespective of whether a mine is making low or high profits. They also want taxes that are simple to measure and therefore difficult to avoid. However, the input and production taxes needed to achieve these objectives can prevent low-profit mines from being developed or from surviving downturns if set too high. The optimal regime must balance the objectives of reliability and simplicity with enabling investors to make their required return from a wide range of mines. Flexible, profit-based taxes are then needed to capture the largest possible share of profits above this threshold.

The sharing mechanisms both hinder and help the regimes achieve these objectives in different ways. Figure 5.5 and Figure 5.6 show the balance between reliability and flexibility by charting the government take at different profit levels—measured in terms of AETR and government share of total benefits, respectively.¹³ The optimal regime described above would, after setting a government take that provides the required return to an investor in a low-profit mine, have a relatively flat AETR for higher-profit mines (which translates to the government share of total benefits slightly increasing with profits) (Wen, 2018).

¹² With a discount rate of 10%. While Ecuador’s sharing mechanism does not account for the labour profit share because none of it will go to the government from 2024 onwards, it is included in the AETR because it is a tax on the project. The Democratic Republic of the Congo’s regime has an excess profits tax that is triggered for a mine when the realized price is at least 25% higher than the price in its feasibility study. The model assumed that the feasibility study has a price of \$1,300 per ounce, so the excess profits tax is not triggered.

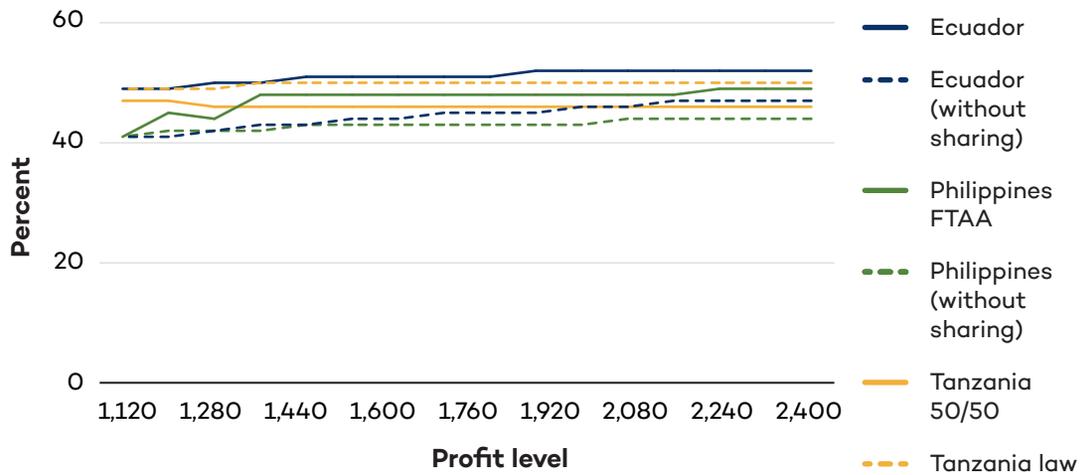
¹³ Total benefits in this case are a project’s revenues minus operating costs and replacement capital (but not minus exploration and development capital). This cash flow represents the money that is available to pay back the initial investment and provide a return.

Figure 5.5. AETR at different profit levels¹⁴



Source: Author, based on modelling.

Figure 5.6. Government share of total benefits at different profit levels¹⁵



Source: Author, based on modelling.

¹⁴ With a discount rate of 10%. The results for only Tanzania, the Philippines, and Ecuador are shown to clearly depict each data point. The results for the other countries can be found in the model.

¹⁵ With a discount rate of 10%. The results for only some countries are shown to clearly depict each data point. The results for all the evaluated countries can be found in the model.



Ecuador's mechanism helps to improve the balance between reliability and flexibility. The investor being able to earn their required return before sharing and sharing being based on cumulative benefits mean that it has a limited impact on low-profit mines. For higher-profit mines, it significantly increases government take. In this way, it operates much like a windfall profit tax. However, its flexibility could be improved further. The exclusion of some taxes from the government's share of benefits means that even low-profit mines may need to make an additional payment. This is particularly impactful because the rest of Ecuador's regime imposes a relatively high burden on mines even when profits are low. This also means the AETR still falls slightly with profits rather than remaining relatively flat. In addition to including all taxes in the government share of benefits, greater flexibility could be achieved by the sharing mechanism having more than one tier.

The Philippines' mechanism improves the government's ability to capture windfall profits. However, it risks increasing the burden on low-profit mines. This is because, while the limited taxes during the recovery period provide some relief, sharing is triggered before the investor earns its required return and is based on annual, not cumulative, benefits. This also limits the scope to capture an even greater share of windfall profits through the sharing mechanism, as a larger government share would risk a higher burden on low-profit mines. A separate windfall profit tax would therefore be needed for this purpose instead.

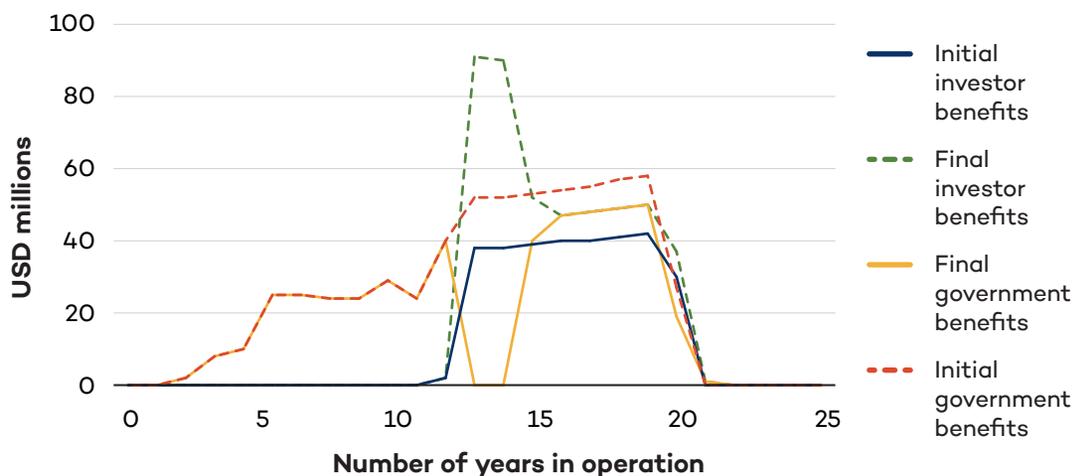
Tanzania's mechanism results in the regime capturing the same share of profits, as defined by the Tanzanian framework, whether a mine generates low or high profits. (This feature is not reflected in Figures 5.5 and 5.6, however, given that the AETR and total benefits use a slightly different definition of profits and are based on discounted cash flows.) The fixed share of profits means that the government must decide whether to impose a large government take on low-profit mines and capture a large share of any windfall profits. Alternatively, it could provide more relief to low-profit mines; doing so, however, would capture a smaller share of windfall profits. The 50/50 split, for example, provides more relief to low-profit mines than the 55/45 split but captures a smaller share of windfall profits.

While a less flexible regime would typically be expected to provide more reliable revenues, this does not appear to be the case with Tanzania's sharing mechanism. This is because it makes all government revenues dependent on the size of total benefits. The government can only receive 50% of total benefits, irrespective of which tax they were initially derived from. Low profits, which in turn means total benefits are small, could therefore impact even the payment of taxes not directly based on profit.

In Figure 5.7, our modelling suggests that there may be years in which the government does not receive any revenues from a gold mine that is producing but making low profits. In this scenario, these 2 years of no government revenues are caused by the build-up of benefits that the government receives prior to the sharing trigger. Once sharing is triggered, the government must forgo tax payments to rebalance and for 50/50 sharing to be achieved. With a mine of average profitability, total benefits are large enough that the government does not have to forgo all its tax payments in any year, as shown in Figure 5.1. However, with low profits, the investor must retain all benefits for a period to rebalance.

While this example shows the potential impact of the government's accumulation of benefits prior to the sharing trigger, periods of no or low profits at other points in the mine's lifetime could also make revenues volatile. Therefore, while Tanzania's mechanism may still generate reasonable government revenues over the project's lifetime, it appears to undermine the reliability of revenues from year to year. As a result, it appears to create a regime that neither captures a significant share of windfall profits nor provides reliable revenues.

Figure 5.7. Tanzania's sharing of benefits across the lifetime of a low-profit gold mine¹⁶



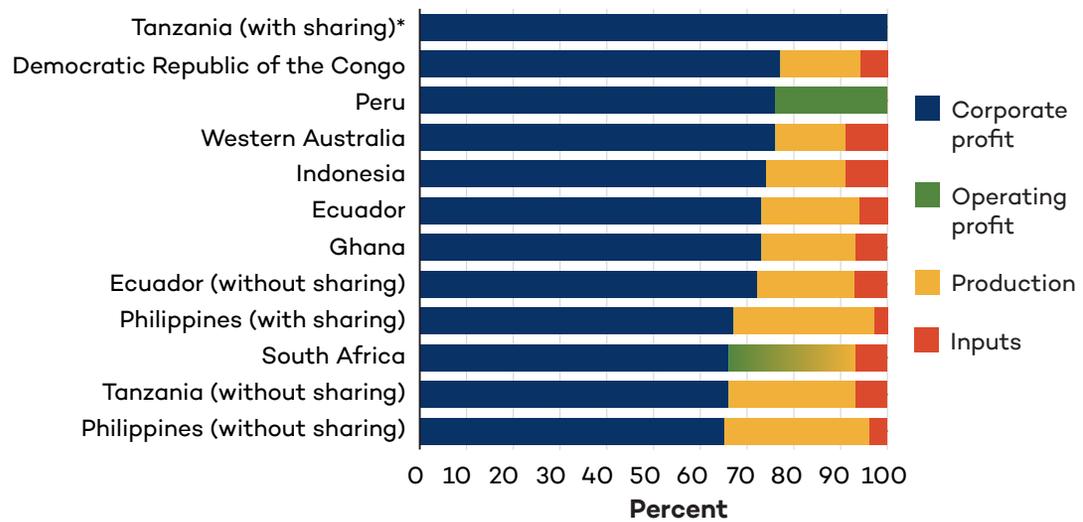
Source: Author, based on modelling.

¹⁶ With a gold price of USD 1,600 per ounce.

5.3.3 Protection Against Tax Avoidance

To measure the simplicity of the regimes and the extent to which they expose a government to tax avoidance risk, the proportion of revenues generated from different tax bases is estimated.¹⁷ Figure 5.8 shows this categorization of taxes according to whether they are based on inputs, production, operating profit, or corporate profit, ordered from the simplest to the most complex tax base for a government to measure.

Figure 5.8. Proportion of lifetime revenues from a gold mine by tax base¹⁸



*Note: While the Tanzania sharing regime includes taxes that are not based on corporate profit, the sharing mechanism results in all government revenues being linked to it.

Source: Author, based on modelling.

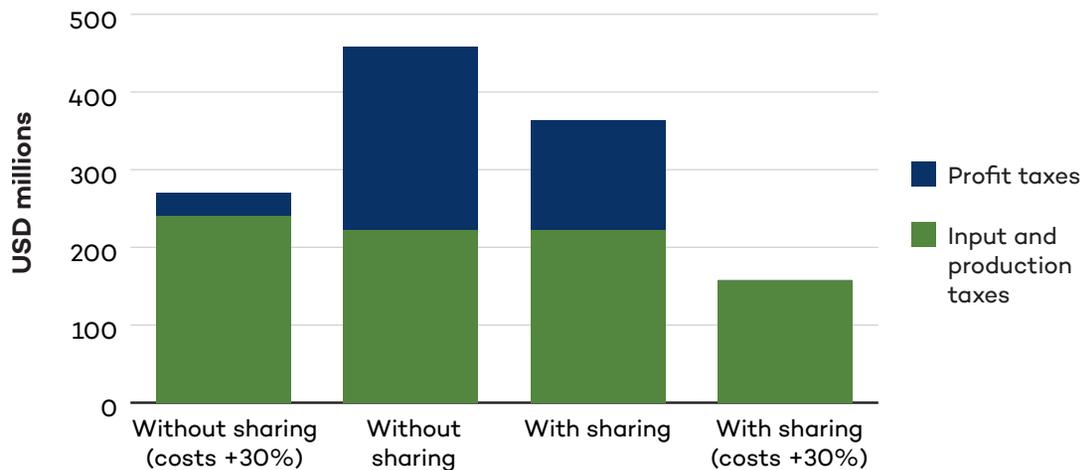
Tanzania’s mechanism significantly increases the government’s exposure to tax avoidance risks. As noted above, all government revenues become dependent on profit. They therefore all become dependent on government capacity to effectively assess profit rather than just the government revenues from profit taxes.

¹⁷ This measure is simplistic in that it does not measure provisions in a specific regime that affect the difficulty in measuring a given tax.

¹⁸ Note that absolute revenue is not equal across each regime, so the absolute value of revenue may be higher in a regime with a lower proportion. The area with a colour gradient for South Africa reflects its royalty having a base of gross revenue but a rate that varies according to a measure of operating profit.

Figure 5.9 shows the potential impact of tax avoidance practices increasing costs and therefore reducing total benefits. Under the regime with no sharing, only profit-based taxes such as corporate income tax would be impacted by such tax avoidance practices. These practices would not affect input and production taxes such as royalties. However, with the sharing mechanism, such practices could result in artificially low profits, which could trigger the ceiling on the government share of benefits and mean reductions in payments such as royalties, even though these payments are usually not dependent on profitability; this is one of the main reasons they are included in fiscal regimes to begin with.

Figure 5.9. Hypothetical exposure to tax avoidance risk with Tanzania’s fiscal regimes¹⁹



Source: Author, based on modelling.

This feature of the mechanism exists regardless of the size of the split. A larger government share reduces the risk that tax avoidance will lower total benefits to the extent that the government’s share is less than the value of input and production taxes. However, it does not eliminate that risk.

¹⁹ With a low-profit mine and a gold price of \$1,600 per ounce.



The Philippines' and Ecuador's mechanisms, in contrast, do not significantly affect government exposure to tax avoidance risks. Determining the need for additional payments to the government depends on the government's capacity to measure profits effectively. But because these regimes do not place a ceiling on the government's share, tax avoidance that reduces profits would not affect the payment of input and production taxes. Tax avoidance could extend the Philippines' recovery period and therefore delay the payment of some taxes, including import duty and interest-withholding tax, given that the end of the recovery period depends on the reported profitability of a mine rather than an ex-ante assessment. However, the rule that the recovery period must end 5 years from the start of production, regardless of whether pre-production expenses have been recouped, limits the extent to which it can be extended.

All three regimes contain measures intended to reduce tax avoidance risks related to financing costs. In the calculation of net mining revenue, the Philippines only allows the deduction of interest payments that are in line with prevailing international rates for similar loans. Similarly, Ecuador only allows the deduction of interest payments from taxable income if the interest rate does not exceed the rate specified by the government. It also prohibits interest on related-party loans from exceeding 20% of a measure of operating profit: earnings before interest, tax, depreciation, and amortization. Discussions with government and industry officials suggest that Tanzania has a stricter rule for related-party loans in the Barrick Gold MDAs, treating them as interest free in the calculation of total benefits. Recent Tanzanian legislation also unusually provides for its mandatory state equity in projects to give the government a share of any loan repayments to related or unrelated parties, which will apply to any sharing arrangement.²⁰ This provision is intended not only to generate larger direct government revenues but also to reduce the incentive to shift profits through inflated financing costs.²¹

These protective measures are not tied to the structure of the sharing mechanisms; however, they could be included in any regime. Indeed, Tanzania's mechanism appears to neutralize the impact of taking a share of loan repayments. The government can only receive 50% of economic benefits regardless of whether they are generated from a share of loan repayments or other revenue streams.

²⁰ Section 10(1)(k) of the Mining (State Participation) Regulations 2020 (Government of Tanzania, 2020). The Barrick Gold framework agreement, agreed the year before these regulations were released, contains a narrower version of this provision. It only provides the government with a share of any shareholder loan repayments and excludes loans for any new investment (Acacia Mining PLC, 2019).

²¹ The merits of some of these protective measures require further scrutiny. For example, taking a share of any loan repayments could result in lenders charging a higher interest rate to ensure they still recoup their loan and a required return. This would not only reduce taxable income but also make it harder for the government to assess whether an interest rate is reasonable because it would not be comparable with industry benchmarks. However, this is outside the scope of this analysis.

5.3.4 Political Economy Challenges

In addition to how these regimes perform in relation to the typical objectives of a fiscal regime, their political economy implications will also be critical for determining whether they represent an improvement on the dominant fiscal regime for mining.

The clearest political economy challenge arises from Tanzania's mechanism. As noted above, if the government has captured a greater share of the benefits than the agreed split, it must make a payment to the investor or forgo future tax payments to rebalance. It will likely be politically difficult for the government to make a direct payment to the investor, and therefore it can be assumed that the government will forgo future tax payments. However, it is possible in some scenarios that the government will need to forgo all tax payments in a given year. This will also be politically difficult. As a result, Tanzania's mechanism could create situations in which the government feels forced to enter into supplementary arrangements to ensure it receives some revenues each year—for example, an arrangement that spreads the amount required to rebalance over several years. Such arrangements, whether fully disclosed to the public or not, could lead to the sharing approach eroding public trust.

5.4 Conclusion and Lessons for Other Countries

This analysis provides three main lessons on how other countries should structure a minimum government share if they choose to adopt one.

The regime should set a floor but not a ceiling on the government share, as the Philippines' and Ecuador's mechanisms do. The fact that Tanzania cannot receive more than the specified share has some unexpected consequences and three main risks: it potentially sets an unnecessarily low ceiling on government revenues (depending on the agreed split), it makes those revenues less reliable, and it increases their exposure to tax avoidance risk. A larger government share reduces but does not eliminate the risk of unreliable revenues and tax avoidance. The Philippines' and Ecuador's approaches, on the other hand, avoid these risks.

The regime should allow the investor to earn its required return before sharing is triggered and then base sharing on cumulative benefits, as Ecuador's mechanism does. Without these features, the Philippines' mechanism struggles to address the fundamental challenge

of balancing reliability and flexibility. A higher government share allows the government to capture more windfall profits but also increases the risk of deterring investment in marginal mines. Ecuador's mechanism, on the other hand, performs more like a windfall profit tax. Given that other aspects of the regime can generate reliable revenues, this approach appears appropriate. That said, the exclusion of several significant taxes from the government's share of benefits means that low-profit mines may still be impacted and could at least partly explain why Ecuador has yet to attract any investment since it introduced the sharing arrangement. This approach could therefore be reconsidered. The mechanism should also take decommissioning costs into account to ensure the overall split between the government and investor across the lifetime of a mine is based on ultimate profits. This could be achieved through, for example, treating investor deposits into a decommissioning fund as a cost in the calculation of profit. Finally, given that any additional payments to the Philippine and Ecuadorian governments depend on their capacity to measure profits effectively, other countries should be aware that these mechanisms do not negate the benefits of simpler instruments to reduce tax avoidance risks.

Setting the minimum share of benefits that a government should receive may therefore be a useful component to incorporate in fiscal regime design, but it does not change the fundamentals and the importance of getting them right. Like with all other fiscal instruments, it will also be important for any government that is considering adopting a minimum government share to analyze whether it will be suitable for the specific country context and type of mine and to determine the threshold above which sharing will be triggered.

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Chapter 6.

Designing and Implementing Production Sharing Contracts for the Mining Sector

IGF and ATAF with input from the governments of Senegal and Gabon

6.1 Introduction

Production Sharing Contracts (PSCs) were piloted by Indonesia in 1966 and soon became popular in the oil and gas sector. They were introduced in the context of increased national ownership and control of natural resources by countries that had recently gained independence (Nakhle, 2010). In the 1960s, the Organization of Petroleum Exporting Countries was formed alongside many national oil companies (McPherson, 2010; Organization of the Petroleum Exporting Countries, 2022). Countries took the view that with more control over their resources, they could increase their financial benefits (Hogan & Goldsworthy, 2010).

In a PSC, the government retains the title of the resource to be produced and contracts an investor to develop it in exchange for compensation. The contractor receives a share of production to cover its costs. The remaining production is shared between the contractor and the state as per an agreed formula. The state can monetize its share of production directly through a state-owned company or an intermediary. The state may also opt to receive its share of production in cash. While production is the main form of payment under a PSC, some governments also impose other charges, such as royalties and corporate income tax.

PSCs have been more popular in oil and gas than mining. This popularity can be attributed to the higher prevalence of state-owned companies for oil than for mining. More than half of global oil reserves are controlled by state-owned companies, which use PSCs to contract private investors to extract the resources on their behalf (International Monetary Fund [IMF], 2012a). In contrast, the mining sector has fewer state-owned companies, and governments instead tend to allocate exploitation licences to private investors in exchange for mineral royalties and the payment of taxes—this is referred to as a tax/royalty regime.

Although, in theory, PSC and tax/royalty provisions can be designed to provide a similar government share of total benefits—also called resource rents—PSCs are perceived to be more beneficial to host countries (Nakhle, 2010).

Some resource-rich countries are expressing an interest in implementing PSCs or another form of production sharing to increase revenues and overall domestic benefits from the mining sector. For example, Azerbaijan has a PSC with Anglo Asian Mining Plc (Anglo Asian Mining PLC, 2022) and the Democratic Republic of the Congo has a PSC for a copper/cobalt mine (Reuters, 2018). Senegal and Uganda are discussing draft legislation, while Papua New Guinea is looking into introducing PSCs (Fall, 2017; Parliament of the Republic of Uganda, 2022; Searancke, 2021).

In the past, Côte d'Ivoire's mining legislation included PSCs, but this was removed from the draft mining law of 2014 (Asselineau et al., 2014; Norton Rose Fulbright, 2017). Egypt also had PSCs for gold but removed this provision after it struggled to generate sufficient interest from investors (Knecht, 2017). Despite limited historical experiences, the current level of interest makes it important to understand the conditions under which PSCs might be suitable for mining.

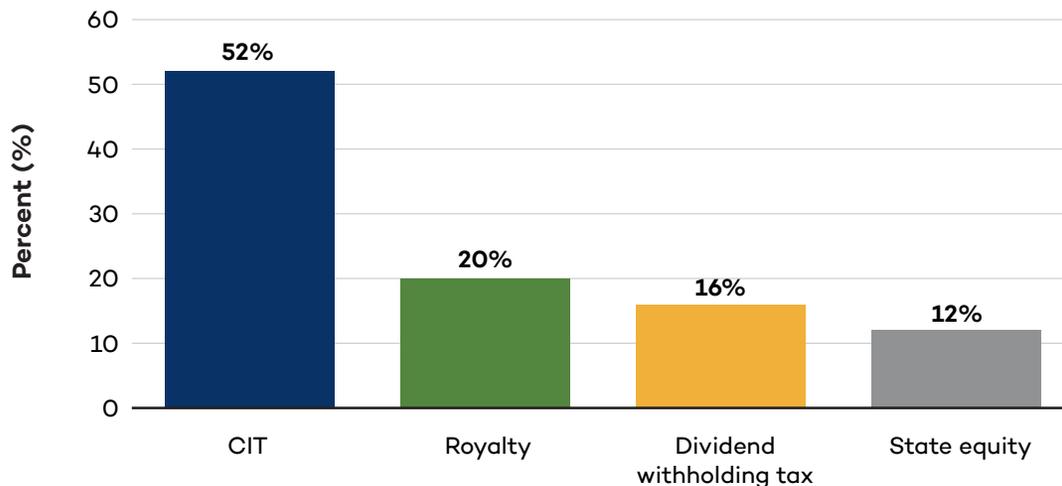
6.2 Comparing the PSC and Tax/Royalty Systems

6.2.1 Tax/Royalty Regime

The design of mining tax systems varies, depending on the policy objectives of each host government. However, the basic mineral sector taxation tools have remained similar over the past several decades. The two main elements are corporate income tax (CIT) and royalties, pillars of the tax/royalty fiscal regime. CIT is based on net profits, with rates typically varying between 25% and 35%. Royalty payments in the minerals sector are typically between 2% and 10% of gross sales and provide earlier and more stable/predictable revenues over the life of a mining operation. Some countries also levy windfall taxes, also known as resource rent tax. Royalty payments are intended to deliver proportionally less than CIT over the life of a mining project (Bouterige et al., 2020). Figure 6.1 shows a stylized depiction of the theoretical breakdown of government revenues from mining, according to ex-ante modelling by the IMF.²²

²² The IMF Fiscal Analysis of Resource Industries (FARI) model is used extensively as part of the Fiscal Affairs Department's technical assistance to governments.

Figure 6.1. Theoretical breakdown of mining revenues by instrument, based on ex-ante modelling²³



Source: Luca & Puyo, 2016.

6.2.2 PSCs

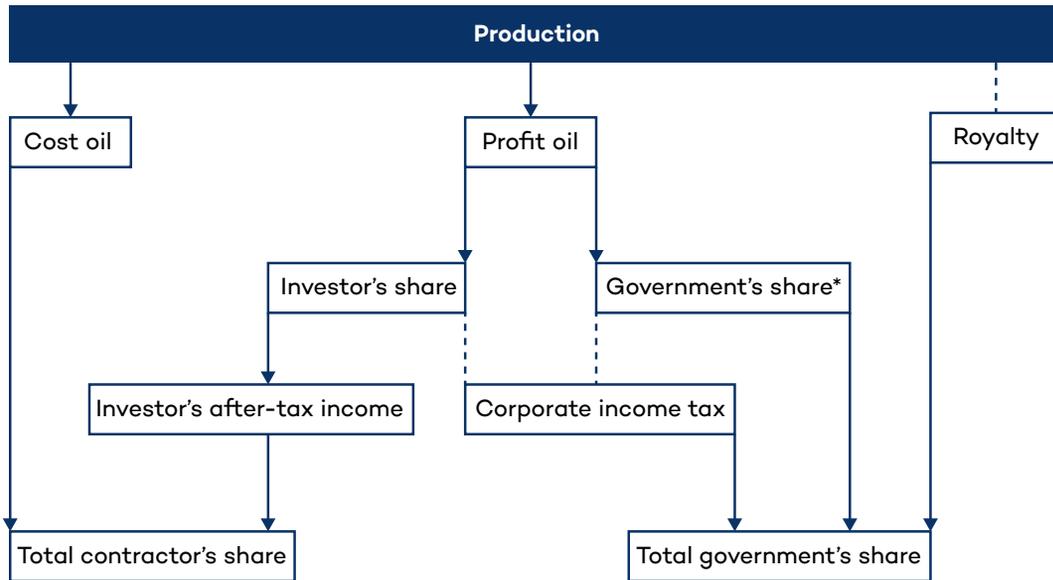
Under a PSC, the government's primary source of revenue comes from its share of production. The state contracts an investor to explore and extract the resource on its behalf. The state retains ownership of the resource to be produced. The investor incurs all the costs associated with exploration and extraction unless the state has a paid equity interest.

A PSC allows the investor to retain a portion of the production each year to cover its costs. This portion is known as "cost oil" and may be limited to a fixed percentage of the resource extracted if the accumulated costs are higher than the annual value of production. This limit is known as the cost-recovery limit or ceiling. If costs exceed the cost-recovery limit in a year, the excess costs are carried forward to be deducted in subsequent years.

The remainder of the production after the cost oil is deducted is then shared between the government and the investor according to a formula agreed upon in advance. This portion is called "profit oil." Figure 6.2 shows the structure of a traditional PSC. Figure 6.3 provides a stylized depiction of the theoretical breakdown of government revenues from a PSC for oil and gas. The difference is clear: Whereas most mining regimes rely disproportionately on CIT, countries operating a PSC regime collect most, if not all, of their revenue from their share of physical production.

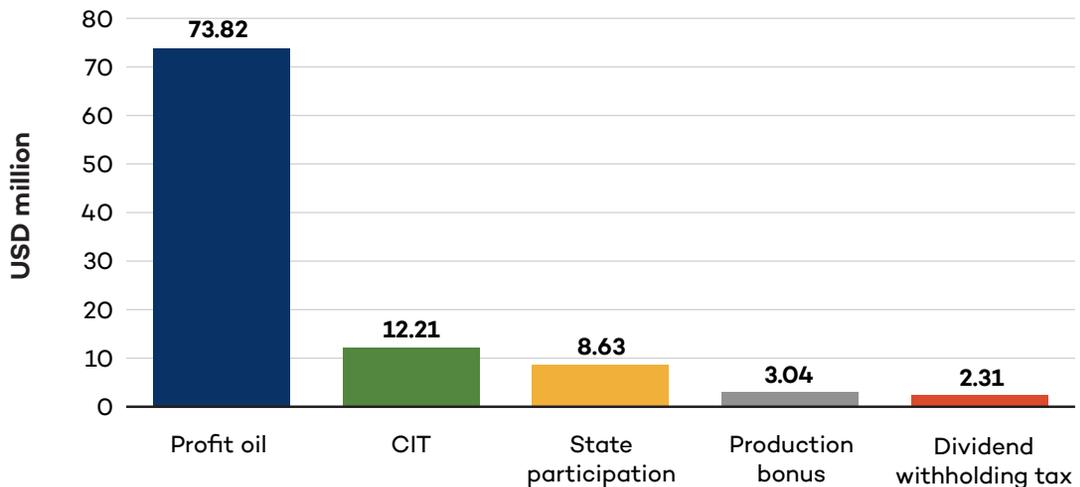
²³ The IMF FARI model assumes a 5% royalty on gross sales, 30% CIT, and 10% free state equity. Two alternative regimes included in the model are an additional profits tax and a tax on rent.

Figure 6.2. The structure of a PSC



*Government's share of profit oil may include CIT payable by the investor.

Figure 6.3. Theoretical breakdown of mining revenues by instrument, based on ex-ante modelling²⁴



²⁴ The IMF FARI model assumes a \$50 million bonus, 80% cost recovery ceiling, 20% CIT, 5% dividend withholding tax, 10% state equity, and 40% to 75% government share of profit oil depending on barrels of oil produced per day.



6.3 Theory Versus Practice

In theory, PSCs and tax/royalty systems can be designed to be equivalent in terms of overall financial benefits for the government—that is, based on ex-ante financial modelling, the annual discounted revenues from the two regimes themselves or the total discounted government revenues for the entire project period would be the same. This is true for any fiscal regime (Baunsgaard, 2016).

In practice, however, this equivalence may break down when the challenges in collecting revenues and the measures put in place to protect the tax base under both regimes are compared. In a tax/royalty regime, while royalty payments guarantee an early and reliable stream of revenue, CIT, which is meant to deliver most of the government revenue, is prone to profit shifting, where multinationals underprice mineral sales or inflate the cost of goods across related parties to reduce their taxable profits (Albertin et al., 2021). It is worth noting that some countries have enacted rules governing related-party transactions that, if enforced, can limit underpricing and overinflation of the cost of goods. In addition, there is generally no limit on deductible expenses for income tax, creating a strong incentive for taxpayers to overstate costs to reduce or defer taxes for many years. While depreciation caps the amount of costs deducted in a year, it only applies to capital, not operating costs. As a consequence, developing countries tend to collect a much smaller proportion of CIT in practice and rely more heavily on royalty payments.

Under a PSC, production can be observed and, as such, more easily monitored. The value of the government share is not determined by related-party sales. Although investors may still inflate their costs under both PSC and tax/royalty regimes, the impact on government revenues is likely to be lower, given the practice of having a cost-recovery ceiling. In both a PSC and a tax/royalty, government can limit the loss carryforward. These features guarantee the government a share of profit oil every year. Considering the potential benefits of relying more heavily on taxes on production, one response might be to increase the royalty rate under a tax/royalty system to guarantee the government a greater share of gross revenues, similar to a PSC. However, while a royalty and cost-recovery ceiling have the same economic impact in theory—both guarantee a share of gross revenue (or production)—in practice, a higher royalty rate would be more distortionary for investors. Royalties and cost-recovery ceilings are only equivalent if the company's actual expenses hit the cost-recovery ceiling or if royalty payments are creditable against income taxes, which is not the case in practice.

Another important difference is the treatment of financing costs. Interest expense is not cost recoverable under most PSCs. Instead, investors are entitled to carry forward unrecovered costs with a fixed uplift to set the share of profit oil at levels above a minimum rate of return. Related-party loans are a major transfer pricing risk in the extractives sector. While not unique to extractives, the scale of investment required means that the risk of excessive interest deductions looms especially large in this sector. Some countries

have reduced this risk by limiting the amount of debt relative to equity or by limiting the deduction of interest expense. By disallowing interest expense and giving a fixed uplift on costs, PSCs significantly reduce the risk of excessive interest deductions eroding government revenues. So would a cash flow tax, as proposed in Baunsgaard (2021). By contrast, financing costs are typically deductible for CIT.

Finally, implementation differences can have a significant impact on government revenue collection. Beer (2020) estimates that African countries are losing between USD 470 million and USD 730 million per year in CIT, on average, from tax avoidance by mining companies. They also show that the mining sector is more prone to profit shifting: a change in the domestic rate of CIT of 1% has historically led to a decrease in sectoral profits by over 3%—more than in the hydrocarbon sector. The authors suggest several explanations, including the frequent use of PSCs and joint ventures in oil and gas and the challenge of determining an arm’s-length price for some related-party transactions in the mining sector (Beer et al., 2021).

6.4 Implementation of PSCs in the Mining Sector

In this policy paper, we assume that mining countries considering PSCs are likely to replicate the designs used in the hydrocarbon sector. They may either adopt a pure PSC with only a production share, possibly including a CIT paid on behalf of the investor, or a hybrid PSC, which includes royalty and/or CIT payments. Box 6.1 contains examples of the production sharing mechanisms adopted by Azerbaijan and Senegal.

Box 6.1. PSC structure for Azerbaijan and Senegal

Example 1: Anglo Asian Mining Plc. has an active PSC with the Azerbaijan government’s Ministry of Ecology and Natural Resources (Anglo Asian Mining PLC, 2022). The company’s cost-recovery limit is set at 75%; it is also entitled to 49% of the profit mineral, while the Ministry of Ecology and Natural Resources takes 51%. In addition, the company pays CIT at 32%. The loss carryforward is unlimited.

Example 2: Senegal is planning to replicate the PSC regime used in its oil sector, which adopts a typical profit oil/cost oil distinction. PSC holders will, however, not be subject to mineral royalties (Roseline Mbaye, personal communication, 2022).



Governments interested in introducing PSCs in their mining sector should consider the following issues:

6.4.1 The Balance Between Risk and Reward

Governments may consider phasing in or selectively introducing PSCs. Mining ventures can represent high risks for investors with large capital costs and long lead times before revenues start to stream in. One way to reduce risks is to increase the certainty of the geological and economic prospects of a mine. Investors may be more inclined to adopt PSCs in areas with proven mineral reserves or for minerals that are in high demand and promise strong financial returns. Senegal, for example, plans to introduce PSCs only in areas with proven resource endowments, called “promotional zones” (Roseline Mbaye, personal communication, 2022). Countries with particularly rich endowments in certain minerals that are critical for the energy transition and extractable at a lower cost than in other regions may be well placed to introduce PSCs for these commodities.

6.4.2 PSC Terms Adapted to Economic Conditions

Critics have argued that PSCs may not be adaptable to the mining sector because of its high extraction costs and the possibility of changes in operating and capital costs across the extraction period, which may mean the cost-recovery limit is no longer viable for the investor (PNG Chamber of Mines and Petroleum, 2020). This may be true—but maybe not for all minerals and maybe not for every mine. Project economics vary from mine to mine and mineral to mineral, which gives governments more room when designing fiscal regimes for projects at the lower end of the cost curve. For each commodity, the cost curve shows the costs of production per unit of each mine, from the cheapest to the most expensive mine in the world. Governments may consider having a high cost-recovery limit for marginal mines or even explore a period with no cost-recovery limit during mine expansion. To successfully implement this, the government may need to increase its capacity to administer and monitor the different variations of the PSC terms.

6.4.3 Simple PSC Structures

A “pure” version of a PSC does not include any other fiscal obligation (Bindemann, 1999). In some contracts, the government’s share of profit may include the amount of CIT payable by the investor. These contracts consider that the government or state-owned enterprise “pays CIT on behalf” of the investor. For the government, this ensures that the project falls under the generally applicable income tax law. For the investor, a CIT paid on their behalf can still be used as a foreign tax credit in its home jurisdiction but does not represent an additional payment or come with an additional administrative burden. Other more recent PSCs may require investors to pay royalties on gross production and/or CIT from their net profit in addition to the state’s production share.

The original PSCs were meant to replace tax/royalty regimes, not to be added as extra fiscal tools on top of them. This objective is rarely understood by countries newly introducing them in their legislation. Many of the fiscal instruments in a tax/royalty system are redundant with PSC terms. For example, a mineral royalty can collect a share of gross sales, as can a PSC with a cost-recovery limit. While additional taxes may increase government revenues, they could prove too onerous, especially when applied to marginal projects, reducing investors' interest in mining projects. Adding CIT makes PSCs more complex to administer. Governments should consider not including mineral royalties and CIT in PSCs.

Some countries have gone a step further to simplify the traditional PSC by eliminating cost recovery. In 2017, Indonesia introduced a variation on its petroleum PSC. The gross split PSC does away with a cost-recovery limit, and instead, the government and the contractor share the total production as per an agreed-upon formula. The formula varies across licences according to different factors, including the location of the field, depth, availability of supporting infrastructure, etc. (Roach & Dunstan, 2018). This approach allows the government to avoid having to verify costs. The challenge is determining the appropriate profit split per project in order to not deter investors. It can also prove to be regressive, especially for marginal projects.

6.4.4 A Simple and Progressive Profit-Sharing Formula

In hydrocarbon PSCs, there are three different profitability metrics used to allocate profit oil between the government and the investor (IMF, 2012a):

Production

The government's share of profit oil increases/decreases with production. Production can be measured in terms of the daily rate of production or cumulative production.

Table 6.1. Government profit share based on the daily rate of oil production (DROP)

DROP in kbpd (thousand barrels per day)	Government profit oil share
Barrels per day < 20 kbpd	40%
20 ≤ barrels per day ≤ 40 kbpd	50%
Barrels per day > 40 kbpd	60%

R-factor

The government's share of profit oil increases/decreases with the investor's R- factor. The R- factor is determined by the ratio of the investor's cumulated revenues over its cumulated costs.

$$R - \text{factor} = \frac{\text{Revenues}}{\text{Costs}}$$

An R-factor equal to 1 means that the investor's revenues equal its costs. An R-factor smaller than 1 means that the investor's costs still exceed its revenues, while an R-factor larger than 1 means that the investor's revenues have exceeded its costs. In a typical extraction project, the R-factor should progressively increase from 0, before the date of first production, to a number higher than 1 after several years of operation.

Table 6.2. Government profit share based on the investor's R-factor

Investor's R-factor	Government profit oil share
R-factor < 1	40%
$1 \leq \text{R-factor} \leq 1.5$	50%
R-factor > 1.5	60%

Project's/Investor's rate of return (ROR)

The government's share of profit oil increases/decreases with the project's/investor's ROR—often the internal rate of return (IRR) of a project.

Table 6.3. Government profit share, based on the investor's ROR

Project's/investor's ROR	Government profit oil share
IRR < 10%	40%
$10\% \leq \text{IRR} \leq 12\%$	50%
IRR >12%	60%

The use of R-factor and ROR is best suited to the mining sector. While the use of production as a metric is simpler, it does not consider the cost profile of the project (i.e., an increase in production may be accompanied by an increase in costs and, as such, should not trigger an increase in profit mineral for the government). Because oil and gas projects have typically been more profitable than mining projects, and variable production costs are a smaller share of total production costs, the risk that a profit oil split based on production makes a project unviable is much lower. R-factor and IRR metrics take into account the costs of production and the price of minerals, and they better reflect the profitability of a project.

The challenge with the R-factor and IRR metrics is that they are harder to administer and more prone to profit shifting than DROP. For instance, the ROR depends on the correct determination of mineral prices and production costs, both challenges that countries may be seeking to limit by adopting PSCs. The DROP is only used to vary the percentage of profit oil split, but one still needs to monitor costs because of cost oil. An alternative is to adopt a sliding scale that varies the profit mineral split according to factors that governments can more easily observe but better reflect profitability. This would be similar to Indonesia's approach using factors such as location, geology, type of deposit (surface/underground), or access to infrastructure.

6.4.5 Limited Cost Recovery

The cost recovery limit varies from one oil and gas project to another. According to Bindemann (1999), the cost recovery limit averages 37% for projects in Middle Eastern countries where the operating margin is high, but 66% and 69%, respectively, for projects in Asia and Central America, where the operating margin is lower. A higher cost-recovery limit helps investors recover their costs sooner. If costs exceed the cost-recovery limit in a year, the excess costs are carried forward to be deducted in subsequent years. In countries where financing costs are not recoverable, the investor is allowed to carry forward such costs with a markup, also called an "uplift."

Governments should ensure that PSCs have limitations on cost recovery, especially if they are exempted from paying a mineral royalty. A cost recovery limit ensures that there is production left, once costs are deducted, to be divided between the government and the investor, allowing governments to receive a share of the minerals as soon as production starts.

Governments should also increase their capacity to monitor costs declared under a PSC. The use of unincorporated joint ventures is common in the oil sector, which makes it easier for companies to monitor each other's costs and thus limit the risk of cost inflation. Unincorporated joint ventures are less common in the mining sector. However, the government can provide a description in the PSC of what costs are to be recovered and the priority of recovery of these costs. They should also include the no-profit rule, which requires



that any shared costs incurred by the operator of a joint venture be charged to the group at the original cost without a profit or markup. This reduces the risk that the operator (or any other partner in a joint venture) inflates the cost of goods and services charged to the group, thus reducing each partner's, and the government's, share of production (Readhead, 2018b). Additionally, governments should request detailed work plans and budgets.

6.4.6 State Capacity to Sell its Share of Profit Mineral

If governments receive their share of production in kind, they have to sell it and try to get the best possible price. This may be a challenge for governments that do not have such marketing capacity. It is even more difficult when the government's share is relatively small, which may put them in a weaker bargaining position. As governments build their capacity to market and sell their share of production, they may consider marketing jointly and selling their share with investors, under the appropriate oversight, or contract an independent third party to do it on their behalf (these options are elaborated below). In Gabon, the government built up the capacity of its state-owned company Société des Mines Equatoriale years before introducing the requirement for companies to give it 10% of their production. It hired Gabonese professionals with experience in the mining industry while training a new cohort of young professionals. As a result, the state-owned company has been able to successfully sell its share of minerals since the requirement was introduced (Marcelle Babin, personal communication, 2022). Options for marketing and selling the government's share of profit minerals:

1. The government could sell its share of profit minerals directly. The challenge with this approach may be access to markets, as well as a lack of marketing knowledge and expertise.
2. The government could sell its share back to the operator at the market price, less the cost to the investor of selling the production. One risk with this approach is that the marketing fee is charged by a related party. To address this, the government could agree to a fixed fee based on a percentage of the company's operating costs or, where the service is provided by a related party, require comparable evidence of at least three third-party quotes.
3. The government could outsource this function to a third-party trader. It is common for mining companies to hire a trading company to market the minerals on their behalf. It is estimated that trading companies handle 20% to 40% of the total international trade of iron ore, copper, nickel, and zinc (Löf & Ericsson, 2019). The trader's fee will lower the government's profits from the sale of its share, but as long as the return is higher than under options a or b, the country is still better off.

6.4.7 Governance of the State Entity Receiving the Government's Share of Profit Mineral

The state-owned enterprise is likely the entity that receives the government's share. In the absence of a strong disclosure and governance framework, there is a risk of mismanagement of the state's share of profit mineral, especially if this share of revenue is spent off-budget. Government should ensure that its share of profit mineral is managed by the central government or that there are proper checks and balances on the state-owned enterprise. Where a country does not have a state-owned enterprise, the ministry of finance can be the designated entity to receive and sell the government's share of profit mineral.

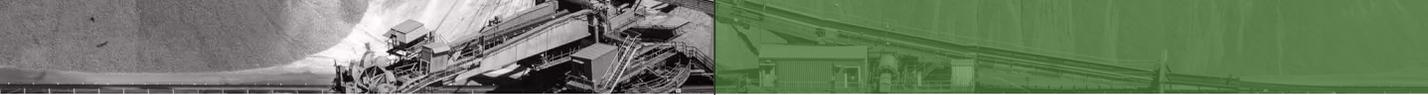
6.5 Implementing Aspects of the PSC in the Mining Sector

Many countries see a direct appeal in PSCs because the government retains title to the production. The feature aligns with a natural sense of resource nationalism felt by citizens of resource-rich countries, who assume that their government will therefore have more control over its resources and capture more of their value (McPherson, 2010).

PSCs represent a different approach to how governments leverage the country's natural resources. A country needs consensus behind policy reform to adopt PSCs for mining. Because the tax/royalty regime is most prevalent in the mining sector and because some countries have already abandoned early attempts at introducing PSCs in their mining legislation, governments may be worried that introducing PSCs will stifle investments, especially when neighbouring countries are still using tax/royalty regimes (Roseline Mbaye, personal communication, 2022). In Senegal, the operationalization of the PSC has stalled since its introduction in the mining law in 2016. This has been attributed to a general lack of understanding of how to implement the regime and how it will interact with other fiscal instruments, such as state equity, in addition to strong opposition from the industry (Roseline Mbaye, personal communication, 2022).

Government may consider introducing or replicating certain aspects of the PSC in their tax/royalty system instead of a complete shift to PSC. Some of these aspects that could potentially increase mining revenues include:

- Government may opt to receive its mineral royalty in kind, as in the cases of Zimbabwe (Reuters, 2022) or Gabon, where, in addition to royalty, the government also receives 10% of physical production as soon as production starts.



Box 6.2. Production sharing in Gabon

In Gabon, the government amended its royalty/tax regime in 2019 to include a 10% share of production as part of a set of reforms to increase financial benefits from the mining sector. In recent mining agreements, the state is entitled to a 10% share of the physical production as soon as production starts. The state mining company, Société Equatoriale des Mines, markets and sells the government share of minerals (Marcelle Babin, personal communication, 2022).

- Government can supplement CIT with a simplified cashflow tax based on R-factor. The profit oil calculation under a PSC is equivalent to a cash flow-based tax. The advantage of a cashflow tax over CIT is that interest on loans, which is considered high risk for profit shifting, is not deductible, making it easy to administer a cashflow tax.
- Government can replicate the cost monitoring mechanisms used in PSCs into their tax/royalty regime. These mechanisms include enhanced oversight of the project through initial approval of a development plan/feasibility study, an annual work plan, and budgets. They should also conduct periodic cost audits.

The decision to adopt a PSC or incorporate aspects of the PSC into the royalty/regime will vary from one country to another. This will depend on the political will to completely overhaul the regime, the capacity to administer a PSC, and the type of mineral involved. Countries that use PSCs in their oil sector are more likely to replicate the regime for their mining sector.

6.6 Conclusion

PSCs may become increasingly common in the mining sector as many countries contemplate reforms that aim to increase national control over critical mineral resources. They are no silver bullet; however, under the right circumstances, PSCs can provide more benefits than traditional tax/royalty concessionary regimes to resource-rich countries and protect against some forms of tax base erosion and profit shifting. To achieve a positive outcome, it is important for governments to consider PSCs as a central piece of their mining strategy, design PSC terms in light of the prospective profitability of their mineral resources, and build the capacity required to monitor contractor costs and sell the state's share of minerals. The government may also consider replicating certain aspects of PSCs in their tax/royalty regime to potentially increase mining revenues.

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Chapter 7.

State Equity Participation in the Mining Sector

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7.1 Introduction²⁵

Historically, many resource-rich countries experienced exploitation of their natural resources by foreign entities, ending up with little or no benefit for themselves. Following independence and decolonization, newly formed states in the 1960s were able to exercise sovereignty over their mineral resources. Several decades later, state equity participation is one of the major issues for contemporary mineral regulation.

According to the African Mining Legislation Atlas (n.d.) *Guiding Template*, “State equity participation refers to provisions that mandate or allow the State to hold a percentage of equity or ownership in corporate entities engaged in mining activities” (Section 36.1). State equity participation is an element of the overall fiscal regime applicable to mining projects that provides an opportunity for states to receive revenue and participate in potential upsides of mining projects. The state may have the right to take the equity interest under applicable legislation, or it may need to negotiate this as part of the granting of the mining title to the company.

Equity participation usually takes the form of a carried interest, free carried interest, or fully paid equity. When the state’s equity interest is paid for in part or in whole, it has a carried or free interest. When the state pays for its own interest, it has fully paid equity. While state participation vehicles are often specified by a state’s laws, they include unincorporated joint ventures, incorporated joint ventures, state-owned enterprises (SOEs), or direct state participation.

²⁵ This policy paper is an abridged version of the *Toolkit for State Equity Participation in Mining Companies* developed by the World Bank (World Bank, 2022).

States must weigh the benefits and risks of each option above when they determine how to participate in mining projects. These benefits include the potential for board membership on mining projects, the amount of risk a state is willing to assume, and the amount a carrying party can recoup before a state can benefit from project revenues.

This policy paper provides guidance concerning the practical implementation of state equity participation. It is an abridged version of the *Toolkit for State Equity Participation in Mining Companies* (World Bank, 2022) developed by the World Bank for African mining countries. Most recommendations, however, would apply to other resource-rich countries across the globe. It aims to help mining countries respond to questions such as:

1. Should a state participate, and if so, at what stage should it become a participant in the equity of the project company?
2. How and when should the state acquire equity participation in the project company?
3. Should the state's participation be "free equity," "carried equity," or "fully paid"? Should there be a prescribed minimum that the state acquires free of charge by law?
4. Which entity will hold and manage the state's equity participation in the project company?
5. What kind of corporate governance structure(s) should be adopted for state participation?
6. How should the state's equity be represented on the company's board of directors? Will the state's equity include any preferred distribution of dividends or other economic or voting rights?

7.2 Objectives and Forms of State Participation

7.2.1 Objectives

Beyond the primary economic objectives, including generating revenue from state equity, the non-economic objectives of state participation include political considerations and a sense of ownership, improved oversight, information rights, and the transfer of knowledge.

Arguably, state equity participation in mining projects is a manifestation of a form of sovereignty over natural resources. It may be important for the government to show that the country, as a sovereign state, maintains ownership over its resources. Public attention has made this issue more pertinent. Equity participation may also enhance states' oversight of mining companies. Many resource-intensive economies depend heavily on revenues generated from their extractive industries.



As a shareholder in the project company, the state will usually be granted board representation in the company, which typically provides the state access to otherwise unavailable information. In such cases, the board member(s) representing the state can better monitor the mining project(s).

Transfer of knowledge is often symbiotic. Knowledge may flow both ways between board members appointed by the project company and the state. In addition, experienced technical personnel from the state may be able to participate in a technical advisory committee.

Notwithstanding, the toolkit suggests that the primary pathway to addressing non-economic policy objectives is either through mining legislation or mining agreements between the state and the project company.

7.2.2 Forms of State Participation

The three possible forms of state participation include carried interest, free interest, and fully paid equity. A shareholder's payment obligation, often like that of a state's equity interest, may be "carried" by other shareholders that pay costs on behalf of the carried shareholder. The paying shareholders then recover those costs from future revenues of the mining project.

Counterbalancing the advantage of a low-risk investment in the mining project and the substantial risk the carrying party incurs, shareholders' agreements or other corporate management agreements may give the carried shareholder less power in relation to management decisions or project development. Additionally, the flow of revenue to the carried party will be delayed until it has repaid carried costs.

In some African countries, the host country is granted a "free interest" in a mining venture.²⁶ In most instances, the interest is not cost-bearing and is not subject to recoupment of cost from future revenues. A free interest is usually low, and there is usually the right to purchase additional equity. In some legislation, the initial free interest cannot be diluted. At times, the laws creating the right to a free interest may not grant the state a seat on the board of the mining company.

When a state chooses to acquire its equity position through the use of its own financial resources, its interest is "paid up." This means that the value of its equity shares is purchased without the assistance of any other shareholder. The state enjoys the full benefits of equity, which include the market ups and downs as well as pro rata control.

²⁶ See generally Kaba, 2017. In 2017, Tanzania also passed legislation creating a free carried interest in mining ventures (Salum & Satchu, n.d.).

7.2.3 How to Determine the Level of State Participation

The level of state participation is usually established in mining legislation. Where a country's laws require state equity participation in every mining project, there are several factors to consider: (a) the stage in the project at which equity participation is required; (b) the mechanism by which the state will acquire its equity interest in the company that has the mining licence; (c) which of the three forms of equity ownership (described above) the state will use and, if the state has an option for additional equity participation on a paid basis, the pricing formula or considerations for such additional shares; (d) governance issues such as board representation, voting and/or veto rights, and antidilution rights; and (e) the state entity or agency that will be responsible for administering the state's equity participation in the project company.

State equity participation may present some disadvantages. For one thing, the state's "shareholders," its citizenry, are likely to have different expectations than the shareholders of international firms. Where the state has fully paid for its equity interest in a project that does not prove profitable or viable for a long time, it may encounter difficulty persuading stakeholders that this equity interest was the best use of state funds. Also, even where equity ownership is "free," there could be capital costs to owners (including the state) (African Mining Legislation Atlas, n.d., Section 36.1). However, these financial considerations may be offset by technology, knowledge transfers, or other policy objectives.

7.2.4 Vehicles of State Participation

Vehicles for state participation are often specified by controlling law and may include unincorporated joint ventures, incorporated joint ventures, state-owned enterprises, or direct state participation.

States may decide to enter into contractual agreements with mining companies to form a joint venture for specific mining projects without forming a separate legal entity. However, many African countries do not allow mining titles to be held through unincorporated joint ventures. An unincorporated joint venture would often designate one party as the manager of the venture and indicate how liability will be shared between the parties.

Incorporated joint venture governance is functionally equivalent, whether the agreement is a shareholders' agreement or joint venture agreement. Both address the relevant business and commercial issues and provide the rights and obligations of the state and the other equity partners or venturers.



The mining legislation should contemplate establishing a corporate entity distinct from other state ministries, departments, or agencies as the entity through which the state holds its equity. The goal is for this entity to have a clear commercial objective and to implement clear corporate governance principles and disciplines (Cameron & Stanley, 2017, p. 125). The law establishing the SOE may cross-reference the provisions of the state's corporate laws and incorporate relevant protections, such as minority shareholder protections and the protections, roles, and obligations of directors.

Under direct state participation, the state acquires equity in the mining titleholder, and the name of a ministry or other government agency appears in the shareholders' register. This form of state equity participation is common in jurisdictions that do not have a state-owned mining investment vehicle.

7.3 Benefits and Risks to State Participation

7.3.1 Non-Economic Benefits

Non-economic policy objectives, including job creation, local beneficiation, and capacity building, can justify state equity participation in mining companies. State equity participation may improve information collection, including but not limited to mapping the country's geological resources.

Two questions arise regarding these policy objectives:

1. To what degree should the state leverage its equity participation to seek non-economic objectives from the project company?
2. As a minority shareholder, can the state actually impose non-economic objectives on the mining companies?

Regarding the first question, the state should consider its role both as a shareholder and as a member of the board of directors. The state could adopt an activist stance and request that certain non-economic objectives be adopted or considered by the company through shareholder proposals, provided that such mechanisms exist under applicable law. More likely, however, the state could exert influence as an equity holder by using its board position to encourage the board to consider, if not adopt, certain non-economic policy objectives during shareholder and board meetings.

In particular, the state may leverage growing environmental, social, and governance (ESG) concerns. ESG refers to criteria used to evaluate companies based on certain nonfinancial factors that investors, companies, and other stakeholders apply as part of their evaluation process to identify material risks and growth opportunities and to assess the future financial performance of companies. ESG factors are now part of the investment decision-making process, along with traditional financial metrics. While they are not compatible with the state's national interests per se, ESG standards may overlap with state policy objectives. Whether or not the state pursues ESG objectives, it is reasonable for it to use its board seat to pursue its strategic policy objectives.

Regarding the second question, a government would not have enough power as a minority shareholder to impose certain non-economic objectives upon the project company. Mining companies are usually reluctant to cede any operational power to the state, particularly where the state has free carried interest equity participation. Shareholders' agreements do not typically focus on non-economic objectives and are an unlikely avenue for pursuing such goals. Non-economic policy objectives are better addressed either in the mining legislation and/or in the mining agreement between the state and the company.

7.3.2 Economic Benefits

The main fiscal benefit of state participation is the dividend payments. A state's equity interest does not typically result in the robust payment of dividends. Since state equity participation is typically in the form of ordinary shares, corporate laws in the relevant jurisdictions will dictate the process and preconditions for dividends to be distributed. Notably, states cannot always freely negotiate the distribution of dividends in the shareholders' agreement or mining agreement.

Accordingly, to facilitate ease of payment of dividends, states must take great care in reviewing the constitutional documents of project companies and shareholders' agreements when taking up equity participation. By choosing to be an equity participant in a project company, the state could share in the upside of the mining company's success. However, in cases where a project company does not produce revenues, the state would not receive its dividends. Some states have tried to implement mechanisms intended to result in a more expeditious payment of dividends, including preferred shares.



State equity participation may result in a capital appreciation of shares. Where state equity is compulsory, the utility of capital appreciation to the state is limited by the often non-transferable nature of equity ownership, as well as the difficulty of monetizing shares. Whether state equity participation is transferable may be answered within the relevant legislation. In some cases, the legislation will stipulate that state equity participation is non-transferable.

7.3.3 The Transferability of State Equity

In some cases, the legislation will stipulate that state equity participation is non-transferable. Elsewhere, policy objectives are a key factor in determining whether state equity should be transferable. Restrictions on the marketability of the state equity interest may adversely affect the monetary/economic value of the state's equity interest. However, states may restrict transferability to maintain equity participation in all mining companies for political reasons and to accomplish certain non-economic objectives. Where the state's primary interest in legislating state equity participation includes the indigenization and empowerment of locals or the state, the state may decide to make the equity non-transferable to ensure the status quo is maintained regardless of the project undertaken. However, if a state's primary interest in legislating for state equity participation is purely economic, it would be preferable for its interest to be transferable because the economic value of the equity interest is often dependent on its resale/transfer value. Some countries have expressed an interest in monetizing state equity participation. To date, it is not clear whether any of these countries have managed to do so successfully.

7.3.4 Risks

SOEs open states to several risks, including but not limited to project, taxation, litigation, economic, minority, and regulatory risks. Not every mining project will be successful: denial of permits, geological impediments, commercial missteps, and so forth may prevent mine development. If the project fails at any stage, the state runs the risk of wasting resources and losing its investment. As an equity participant, the state also takes on the downside risk. If the project does not produce revenues, there will likely be no profits from which dividends can be paid. SOEs are also subject to taxation risks, including income and capital gains taxes, as separate entities from the state itself.

State corporate laws, shareholder agreements, and the availability of sovereign immunity defences may limit litigation risks. Nonetheless, equity participation opens states to litigation or other claims and possible disputes among shareholders or management. Economically, returns on state equity rest on dividends from future profits or a distribution

of equity from a sale of the company or its assets, both of which are subject to macroeconomic factors. A state must also balance taxes, economic gains, and equity demands within its fiscal regime. Moreover, as states are typically positioned as minority shareholders, they are often at the whim of decisions made by majority shareholders that affect mining ventures. Finally, changes or extensions in regulatory schemes can have adverse effects on mining projects. Further, as an owner and regulator of projects, states must navigate and avoid potential conflicts of interest.

7.4 Considerations for State Participation

7.4.1 What Should Governments Consider?

Should a state participate, and if so, at what stage should it become a participant in the equity of the project company?

This question has two parts. First, the state must determine whether it wants to take equity in mining ventures. In some circumstances, there is a legal requirement in mining legislation or other laws that the state must hold equity in mining ventures. Even where there is no express legal requirement to take an equity position, the state may have the option to negotiate for equity as part of the granting of a mining lease or concession or under the terms of a mine development agreement.

In assessing whether to take equity in a project company, the state should be realistic about the fiscal benefits of that equity. As discussed above, the distribution of cash from dividends associated with equity is typically fairly limited and not as robust as the other elements of the fiscal regime that are applicable to mine investments. An equity interest may provide a greater financial benefit upon the sale of the company, but that financial benefit is remote and uncertain. However, there are other benefits to holding equity ownership in a project company, such as participating in decision making and having access to information. Also, holding equity in a project company may be seen as an important reflection of the fundamental ownership of minerals by the state. However, properly managing equity interest will require a commitment of resources by the state. *In short, the state must balance the various benefits and commitments of owning equity with a clear view of its policy and fiscal rationale for taking equity when determining whether it is in the interest of the state to own equity in a project company.*



How and when should the state acquire equity participation in the project company?

Once the state determines that it will take an equity interest in the project company, it must determine whether to take that interest immediately or wait for the project to develop. A mining project will proceed through an exploration phase, which will determine the nature of the available resource through a feasibility study, which will, in turn, determine whether development is economically viable; only then will it move to construction and production. The state may choose to take its equity immediately and participate as an equity holder through the exploration phase. It may also choose to wait until exploration or the feasibility study has been completed. If the state is paying for all or part of its equity position in the company, it may choose to wait until later in the mine development process. Doing so decreases the investment risk because the exploration and feasibility phases reduce the uncertainties related to the mining venture.

The previous paragraph addresses “when” the state should take its equity in a project company. This question also asks how it should do so. First, the state must determine the internal capital structure of the company. Most companies have a large tranche of ordinary shares or interests, often called “common stock.” Owners of these shares or interests are entitled to participate in the economic success of the company and will have some right to vote. In most jurisdictions, the officers and directors of the company will have some duty to protect the interests of the common shares. That said, a project company may also have a tranche of preferred shares or interests with rights and protections that are more favourable than those granted to the common shares. The preferred shares may be entitled to capture the economic benefits of share ownership in preference to the common shares and may have voting rights greater than those granted to the common shares. So, the state will need to determine whether taking equity in common shares is acceptable and the extent to which its rights may be affected by preferred shares (if any). Note that preferred shares are often used to secure investment in or financing of the company; the state may find the right for it to have preferred shares to be an acceptable method of providing the economic incentive needed to allow a project to be developed.

In most circumstances, the state’s equity will be in the form of common shares. Some mining legislation requires a specific percentage of interest to be held by the state, or the legislation may specify that the state’s equity cannot be diluted. Where the legislation is silent on this issue, the state should include an assessment of the risk of dilution as part of the negotiations related to its equity participation in the company.

Should the state's participation be "free equity," "carried equity," or "fully paid"? Should there be a prescribed minimum that the state acquires free of charge by law?

As discussed above, there is very little practical difference between "free equity" and "carried equity." Mining legislation often specifies that the state's equity interest in the company is "free." For either a free interest or a carried interest, the state does not make a cash payment in exchange for its equity in the company, and once the state holds its equity, it is not required to fund the costs of the mining project. The other owners of the company will pay those costs and "carry" the state's interest. Alternatively, the state may pay for its equity interest at the threshold and participate as a fully paid-up equity holder, along with the other owners of the company.

Paying for equity in the company creates some risk. That said, being carried is not without its disadvantages. The shareholders' agreement or other corporate management agreements may give the carried interest less power in relation to management decisions or project development. Given that the carrying party is taking on all the risk of mine development, that party may insist on the right to decide how investment in the mining project will proceed. Additionally, since the carried costs must be repaid, the flow of revenue to the carried party will be delayed even beyond the point where the initial generation of revenue from the project begins.

Which entity will hold and manage the state's equity participation in the project company?

Mining legislation in Africa sometimes specifies that state equity is to be held by a state-owned mining company; in other circumstances, the legislation simply says that the state is entitled to an equity interest. In most circumstances, the state's equity interest can be held by the central government, by an agency or ministry of the state, or by a state-owned mining company. As discussed above, there are advantages and disadvantages to each option. When choosing how to hold an equity interest, it is crucial to consider placing the interest in an entity or agency that will have the resources and expertise needed to properly manage and optimize the state's interest.

What kind of corporate governance structure(s) should be adopted for the state's participation?

Any equity interest in a project company will be governed by the company's corporate organizational documents. In most cases, the state's equity interest will be subject to a shareholders', stockholders', or corporate operating agreement, or a similar instrument that sets out the rights and obligations of equity holders and provides the rules applicable to the internal management of equity interests. The unabridged toolkit (World Bank, 2022) sets out the various issues to be addressed in the organizational documents of the company. Note that the governance of the company will also be subject to the laws of the state in which the entity is organized.

How should the state's equity be represented on the company's board of directors? Will the state's equity include any preferred distribution of dividends or other economic or voting rights?

Holding an equity interest in a company does not necessarily entitle a shareholder to a seat on the board of directors of the company or a role as an officer of the company. If the state wants a seat on the board of directors or management committee of a company, that right will have to be negotiated in the definition of the terms concerning the state's equity participation. Serving as a director entails undertaking a duty to protect the interests of the company and all its shareholders; the state should carefully consider whether it wants to designate someone to take on that role and what benefits it hopes to accrue from taking a position in the management of the company. In many cases, the primary purpose of taking an equity interest in the project company is to capture economic benefits for the state; and if that is the purpose in mind, having a role as a director or officer is not necessary. A state may also seek enhanced economic returns or a preferred voting right, such as a "golden share." These rights, while beneficial to the state in the abstract, can make the mining venture less feasible to investors and should be weighed as part of the overall balance to be found among the various elements of the fiscal regime applicable to the project.

7.4.2 Toolkit for State Equity Participation

The unabridged *African Mining Legislation Atlas Toolkit for State Equity Participation in Mining Companies* (World Bank, 2022) provides 22 items to consider when approaching state equity participation, which are condensed here:

- ITEM 1** | When considering the role of an SOE in a mining project, consider how the SOE may advance or impair the twin goals of (i) attracting investment in the minerals sector and (ii) ensuring a fair return to the state and its citizens.
- ITEM 2** | State equity participation in the mining company, especially if it includes a carried or free interest, may affect the economic viability of a project.
- ITEM 3** | As an equity participant in a project company, an SOE will be subject to indirect taxation.
- ITEM 4** | Requiring contributions to a social development fund is a way to increase the benefits to both the communities that are connected to and impacted by mining projects and the state as a whole.
- ITEM 5** | States should be clear about what they intend to accomplish through their equity participation and should be realistic regarding the potential revenue they can expect to receive. There are three options: state equity mandated by law, commercial participation, and hybrid state equity participation.

**ITEM
6**

In addition to or as an alternative to state equity ownership, consider legislation or policies that promote equity ownership by citizens or businesses within the country.

**ITEM
7**

State equity participation is not essential for the country to be a successful mining jurisdiction. States should consider both fiscal and policy objectives when determining whether to require or promote state equity ownership.

**ITEM
8**

It is important to develop administrative expertise within the state to ensure effective oversight and management of the state's equity interest.

**ITEM
9**

While state participation may not necessarily be the means through which the state achieves its non-economic objectives, it may be helpful in achieving those objectives.

**ITEM
10**

When determining the level of state participation, the state must consider the goals of economic return and corporate governance. States must balance equity participation, especially where free or carried, with the ability to participate in company decision making.

**ITEM
11**

If the state is flexible in setting the nature and percentage of its equity interest, it should assess whether it is best to pay for its interest or to request a free or carried interest.

**ITEM
12**

Many mining laws include a requirement that the state or an SOE be granted a free or carried interest in the project company.

**ITEM
13**

The tool that should be used to memorialize this type of arrangement is a joint venture agreement.

**ITEM
14**

The tool that should be used to memorialize this type of joint venture is typically a shareholders' agreement.

**ITEM
15**

Mining companies must consider ESG criteria and targets in their projects and corporate actions. Likewise, states, as equity holders and board members, must incorporate ESG principles into decision-making processes as well as governing legislation.



**ITEM
16**

If the state hopes to capitalize on its equity interest, it may want to have a robust right to transfer its interest to a third party in a sale.

**ITEM
17**

A net profit interest is one alternative to equity interest that provides a mechanism for participating in the economic upside of a mining project.

**ITEM
18**

The SOE should develop a conflict-of-interest policy or guidance document describing how its representatives are to act when managing the state's equity interest.

**ITEM
19**

If the state intends to take an equity interest in mining projects on a regular basis, it is worthwhile to develop a model contract to use for equity investment and for future negotiations.

**ITEM
20**

Governance is a critical component of a state's equity participation in a project company.

**ITEM
21**

OECD's Principles of Corporate Governance include the basis for an effective corporate governance framework, rights of shareholders, the equitable treatment of shareholders, the role of stakeholders, disclosure and transparency, and responsibilities of the board.

**ITEM
22**

The state should consider waiving sovereign immunity when it holds equity in mining companies.

The unabridged toolkit also includes a Checklist for State Equity Participation in Mining Projects (World Bank, 2022). The checklist includes (1) the basis for equity participation, (2) the form of equity participation, (3) holding equity interest, (4) entering into a shareholders' agreement to document the terms of the equity interest, (5) a description of the management structure of the company, (6) shareholder action, (7) budget and financial reporting, (8) financing and capital, (9) the nature of SOE financial interest, (10) dividends, (11) transfer of shares, (12) confidentiality, (13) representation and covenants, (14) indemnification, and (15) dispute resolution.

7.5 Conclusion

Resource-rich countries can utilize state equity participation to capitalize on and maintain control over mining economies. Among non-economic objectives, state equity in mining projects can show sovereignty over a state's mining resources while improving oversight for the industry, as well as access to information and transfer of knowledge.

State equity participation can benefit the state financially with capital appreciation of shares and dividend payments. Although many mining projects take a long time to produce dividends, some states have mechanisms in place to ensure a dividend payout. Moreover, with equity in a mining project, a state may benefit greatly from selling its equity after the project has increased in value. However, the ability to capitalize on economic benefits could be hindered if equity is non-transferable.

Often, states' laws will dictate how they can participate in mining projects. Nonetheless, any opportunity for state participation in a mining project requires careful consideration of the short- and long-term objectives of the government and benefits to the state and its citizenry.

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Chapter 8.

Increasing Fiscal Benefits Through Commercial State-Owned Enterprises in the Mining Sector

IGF and ATAF

8.1 Introduction

State-owned enterprises (SOEs) are significantly more prevalent in the oil and gas sector than in the mining sector. The change came in the 1950s when many oil-producing countries began to feel unfairly treated by private companies who had been granted generous concessions by governments that then had no claim on the petroleum produced; they were merely receiving royalty payments and unreliable tax revenues. The rising wave of independence post-World War II led many governments to want to reassert their sovereignty over natural resources and increase their share of the profits from oil and gas (Duval et al., 2009). This position was welcomed by the United Nations (Shihata, 1976, p. 261).²⁷

In addition to the political appeal, it was thought that ownership would equip host countries with the skills needed to operate their own oil fields without the involvement of foreign firms. Countries often ended up with 100% ownership, which was then vested in a national oil company (NOC). There was a transitional period during which some private companies' concessions continued, but these arrangements were mostly phased out after the 1978–1979 oil price shock. Consequently, 86% of the world's oil reserves are state-owned today, and they are growing in terms of output (Mitchell et al., 2012, p. 27).²⁸

²⁷ The Programme of Action on the Establishment of a New International Economic Order issued by the U.N. General Assembly on May 16, 1974, specifically welcomes “the increasingly effective mobilization by the whole group of oil-exporting countries of their natural resources for the benefit of their economic development.”

²⁸ Output from state-owned oil reserves grew by 40% between 2000 and 2010, while output from private reserves fell by 20% (Mitchell et al., 2012, p. 37).

Oil- and gas-producing countries were not alone in desiring greater state participation in the sector. SOEs in the mining sector date back to the early 20th century when political movements such as the Russian Revolution and decolonization increased the desire for countries to regain ownership of their resources.

Examples of early SOEs include Finland's Outokumpu (1914), Sweden's Luossavaara-Kiirunavaara Aktiebolag (LKAB) (1890), and Morocco's Office Chérifien des Phosphates (OCP) (1920). As more countries gained independence, they nationalized their mining assets. They shared the view that the concession regime had allowed international mining companies and foreign investors to obtain most of the rent from the mineral industries, leaving very little of the proceeds for the host country (Otto, 1995). By 1984, SOEs controlled half of the value of metals produced (World Bank, 2011). High commodity prices and demand for minerals to build back economies after World War II sustained the profitability of SOEs.

However, unlike oil and gas, the rise in state participation in the mining sector, whether through complete nationalization or contractual arrangements, was comparatively short-lived. By the end of the 1980s, state participation in mining had stopped almost entirely in developed countries. When nationalization had begun, mining was at the top of the market, benefitting from unprecedented growth in metal production and prices post-World War II; however, over the ensuing 30 years, metal prices were in almost continuous decline (World Bank, 2011). By contrast, oil prices rose exponentially during the period (Radetzki, 2012, p. 384).²⁹ This meant that NOCs were in a better position to absorb any economic inefficiencies arising from state ownership, which was coming under pressure due to the rise of the free-market approach (Radetzki, 2008).³⁰

There is a handful of mining SOEs today, including Chile's Corporacion Nacional de Cobre de Chile (Codelco) (Odendal & Dolo, 2018), Indonesia's PT Aneka Tambang (ANTAM), Saudi Arabia's Ma'aden (Trade Arabia, 2022), and Sweden's LKAB (Nilsen, 2022). Some of these entities have been so successful that the presence of private mining companies has fallen in the host country (Caprioni, 2013).

There has also been renewed interest in state participation since mineral prices began to rise from 2003/2004 onwards. Namibia established Epangelo in 2013 (Epangelo Mining Company, n.d.), Guinea and Gabon formed SOGUIPAMI and the Société Equatoriale des Mines (SEM), respectively, in 2011, while Erdenes Mongol LLC was formed in 2007 (Erdenes Mongol, n.d.-a). Zambia Consolidated Copper Mines Limited (ZCCM-IH), which was formed in 1982 and until recently managed the government's minority share, has taken over full control of Mopani Copper mines from the private sector (NS Energy, 2021). Finally, the recent demand for critical minerals is leading some countries to want to capture more benefits through SOEs. Mexico has established an SOE for lithium; Chile has similar plans.

²⁹ See Figure 1 in Radetzki, 2012, p. 384.

³⁰ Radetzki (2008) argues that one of the reasons for less privatization in oil is because of a more forgiving attitude toward inefficiency nurtured by the high profitability of the oil industry.



Despite mixed historical experiences, the current level of interest in direct state participation makes it important to understand the conditions under which state-owned mining companies can be successful. This policy paper gives recommendations to governments that are considering introducing, expanding, or reforming commercial SOEs in their mining sectors.

8.2 Reasons to Establish an SOE for Mining

Governments have often relied on SOEs to assert greater control over their economy and over the exploitation of natural resources in particular. They can assign various objectives to their SOEs in the mining sector.

8.2.1 Control of Strategic Minerals and Energy Security

SOEs can be formed to control specific minerals that are considered strategic for a country. This is one of the reasons SOEs have been more common and enduring in oil and gas. The role of oil in energy generation means there have been strong economic and national security reasons for oil-producing countries to retain control of supply through SOEs (Mitchell et al., 2012).³¹ There have also been cases in the mining industry. During World War II, for example, the aluminum industry was under the strict control of governments because of its use in the aviation industry. Iron ore, used to produce steel, has been critical to countries' industrial development, and hence iron ore mines were nationalized not only in developing countries but also in European countries such as Sweden (World Bank, 2011).

Currently, many countries are categorizing technology minerals required for the energy transition as strategic minerals. "Technology minerals" are the geological sources for the metals, alloys, and chemical compounds used in the production of modern technology (Ali et al., 2018, p. 4). Electric vehicles, for example, depend on cobalt, copper, nickel, and lithium. Countries home to these resources may wish to assert greater state control over them through fiscal and industrial policy. For example, Chile considers lithium to be strategic because of its use in manufacturing nuclear weapons, and as such, it can only be mined by SOEs (Perotti & Coviello, 2015). Similarly, Mexico has legislated for the state to exclusively mine lithium and has since formed a state-run lithium mining company—Litio para Mexico (LitioMx) (Reuters, 2022). Of course, not all minerals will be strategic. However, those that are may warrant greater state control.

³¹ It constitutes roughly 57% of global energy consumption (Mitchell et al., 2012, p. 12).

Box 8.1. Emerging lithium SOEs in the Americas

Mexico's recently set-up SOE, LitoMx, will be responsible for managing the exploration, exploitation, and refining of lithium. The objective is to secure the country's energy sovereignty over lithium, which is considered strategic and necessary for the energy transition, technological innovation, and national development (Secretaria de Gobernación, 2022). The law lists clear, well-defined objectives for the SOE, including working with the Mexican Geological Service to identify geological areas with probable lithium reserves. It also describes the board composition and financing structure.

Chile also plans to set up a majority-owned SOE for lithium. The goal is for the government to partner with private sector lithium companies. While Chile has extensive experience in the metallic mining sector through Codelco, they believe their lack of experience in the non-metallic industry, specifically lithium, requires the involvement of the private sector as a strategic partner. Private companies' expertise in the lithium space, according to the government, is an opportunity to advance the exploration and development of lithium projects in Chile (Republica de Chile Senado, 2022). There are no details yet on the size of the state's ownership stake in the Chilean lithium SOE or institutional arrangements for the exercise of the state ownership function. Currently, Chile leases its lithium exploitation licences to private companies through a bidding system.

Peru also considers lithium a strategic mineral, given its use in powering electric vehicles. The Andean country aims to build a lithium-processing industry as it has huge proven reserves of lithium located in Puno (Tiempo Minero, 2022). The Peruvian government has set up a working group led by the mining ministry to recommend good practices to explore, exploit, and industrialize its lithium (Ministerio de Energía y Minas, 2022).

These initiatives are not new in the Americas. For many decades, Bolivia has had a state-owned lithium company, Yacimientos de Litio Bolivianos (YLB). Only YLB is allowed to extract the mineral. YLB has had difficulties in mining lithium commercially by itself³² and is looking for strategic partners to strengthen its mining capacity (Rochabrun, 2022).

³² "YLB has been spread too thin and tasked to develop too many complex projects simultaneously and consequently has not made very much progress in the last decade," a Payne Institute analyst wrote in a June 2020 report (Martin, 2022).



8.2.2 Increase Mining Revenues

SOEs have typically been associated with higher government revenues (Bauer, 2018). Governments can collect not only taxes and royalties but also dividends from SOEs. If the state becomes the only investor, all benefits are channelled to the state as opposed to being shared with the investor. Governments can also direct their companies' spending beyond their core commercial mandate into so-called "quasi-fiscal" or "parafiscal" expenditures, such as serving national debt or building or maintaining infrastructure. These activities might make sense in the country context; however, there is also a risk that they drain the SOE of the funds needed to fulfill its commercial role (Manley & Wake, 2015).

Governments may also aim to avoid a loss of revenue from tax evasion and tax avoidance. In theory, as a shareholder of a mining company, the government should direct it to report the true extent of its profits domestically. Private (foreign) shareholders, on the other hand, might be tempted to direct the company to engage in aggressive tax planning and profit shifting. In practice, it is still necessary for the tax authority to closely monitor the SOE. In 2016, Codelco withdrew from a joint venture with China Minmetals Corporation following concerns from the Chilean tax authority about the channelling of exports through a company in Bermuda. Codelco was also required to pay USD 149 million in back taxes in 2015 (Hanni & Podestá, 2019).

Finally, having an SOE may make it easier for a government to adopt a contractual regime, often considered more robust to profit shifting than the concession regime typically used in mining. A contractual regime is where the state retains ownership of both the resource and production (e.g., a Production Sharing Contract or risk service contract). Governments may find it easier to sell their share of production and manage commercial operations through an SOE.

Box 8.2. Codelco's and OCP's contributions to government revenues in Chile and Morocco, respectively

Codelco-Chile

Codelco remits the following monies to the government (African Development Bank, 2016):

- a. Income taxes, which include a first-category tax of 20% and a surcharge of 40%, which is applicable to all public companies in Chile.
- b. A specific mining tax.
- c. Statutory transfers to the armed forces of 10% of export earnings.
- d. Profits at the end of the year as agreed between the Ministry of Finance and Codelco.

Private companies, on the other hand, remit income tax, withholding taxes, and, more recently, royalty payments to the government (Azzopardi, 2021).

Codelco contributes 8% of the world's copper production. Since its formation in 1976 until 2021, it generated in excess of USD 142 billion in pre-tax profits (Codelco, 2021). In the first 5 years of its formation, Codelco increased production by 50%. In 1996, while private investors remitted USD 156 per tonne in taxes to the government, Codelco paid USD 860 per tonne (Odendal & Dolo, 2018). In 1999, private investors remitted USD 350 million in taxes, less than half what Codelco paid in taxes in 1994, even though it only produced 39% of private investors' production. Codelco contributed 11% of government revenues between 1990 and 2010 (Odendal & Dolo, 2018).

Codelco's success has been attributed to operational efficiency, as evidenced by the falling number of employees over the years and its strength in underground and open-pit mining.

Table 8.1. Codelco's performance in the past 6 years

	2016	2017	2018	2019	2020	2021
Copper production (thousands of refined tonnes)	1,827	1,842	1,806	1,706	1,727	1,728
Transfers ⁱ to the treasury (millions of USD)	942	1,366	1,809	1,000	1,292	5,548
Consolidated EBITDA ⁱⁱ (millions of USD)	2,918	5,667	4,696	4,043	5,289	10,379
Direct number of employees	18,605	18,562	18,036	16,194	15,267	15,609

Source: Codelco, 2021.

i Includes income taxes, royalties, export taxes, and dividends.

ii Consolidated EBITDA represents earnings before interest expenses, taxes, depreciation, and amortization.

Morocco's OCP has experienced good performance over the years and even distributed dividends to its shareholders. The increases in revenues by more than 50% in 2021 and by 30% in 2022 are attributed to the high prices of its products, which include phosphate rock, and low production costs (Kasraoui, 2023). Its production capacity increased four times between 2012 and 2021 (Maussion, 2023).

Table 8.2. Morocco's OCP's performance in the past 5 years

	2017	2018	2019	2020	2021	2022
Revenues (millions of USD)	4,796	5,528	5,349	5,557	8,336	11,330
EBITDA (millions of USD)	1,258	1,689	1,516	1,845	3,587	4,952
Dividend per share (USD)	2	3	4	5	6	10

Source: OCP, 2023; financial results for 2017–2022. The exchange rate used is MAD 1 = USD 0.099.



8.2.3 Replace Private Investors

SOEs can replace private investors who are reluctant to invest for economic and political reasons. For example, ZCCM-IH took over the administration of the Mopani mines after the investor stopped operations for economic reasons (NS Energy, 2021). Public capital may also be able to take a longer-term approach than private capital.

8.2.4 Gather Market Power

With better control over mineral supplies, governments can ensure a more reliable, less volatile market that provides sustained benefits to producers. The example of the Organization of Petroleum Exporting Countries (OPEC) shows how government control of production and exports of a commodity can be used to stabilize prices and ensure long-term returns for producing countries. One third of global oil production is regulated by OPEC. By controlling the supply of oil, it has typically been able to prevent oil prices from falling below the levels desired by members (Baunsgaard, 2001, p. 4).³³

In the past, bauxite producers also found coordination useful. The International Bauxite Association (IBA) existed from 1974 to 1994. It arose at a time when the bauxite industry was dominated by a small number of global corporations that dictated prices paid to producers. The IBA was able to improve the return for members through the exchange of information. It disbanded once the industry had become less integrated and opaque (James, 1994). Morocco's OCP dominates the international phosphate market as it controls 70% of the world's phosphate reserves. Most phosphate benchmark prices are set in reference to OCP's products. China has established SOEs to consolidate its control of the strategic rare earth minerals and influence prices (Chang, 2022). Indonesia is also exploring developing an OPEC-style arrangement for technology minerals (Dempsey & Ruehl, 2022).

8.3 Potential Risks for SOEs in the Mining Sector

Many SOEs have failed to achieve these objectives and have often been plagued by poor governance (World Bank Group, 2014). As a result, many countries have dormant SOEs, or they have resorted to managing small state equity participation. Countries face certain risks by giving SOEs a large role in the development of the mining sector. The main ones are listed in the following subsections.

³³ While OPEC has deliberately kept oil prices low at different points, it controls the fall in prices, rather than mineral-producing countries, which are typically price-takers.

8.3.1 Inefficient Sector Development

SOEs might not be able to develop the sector as efficiently as private investors, especially in complex geologies. It may be more challenging when the mine is not developed, and the SOE must undertake exploration.

Technological innovation is becoming increasingly important in the mining sector. Declining global mineral reserves mean that mining companies have to explore new deposits found deeper in the subsoil. Likewise, as mining activities mature, companies are faced with declining ore grades, rising stripping ratios, and increasing hauling distance due to deeper ore locations. Other factors include improving mine safety and managing environmental impacts, making new technologies critical to the mine of the future (Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development, 2021).

8.3.2 Lack of Access to Finance

SOEs may struggle to raise the capital required to fund exploration and development, which are critical to establishing sustainable mineral production (McPherson, 2010). Governments have competing development needs, and, for some countries, investing in such a risky venture may not be feasible. The severe debt crisis unfolding across many resource-rich developing countries makes this even more problematic (Jensen, 2022).

In the medium to long term, new mining SOEs could finance themselves via market capital by listing shares on public stock exchanges. Public listings can create strong incentives for SOEs to act with discipline and accountability while also generating revenues. This may be a long way off, however. Codelco, one of the most successful state-owned mining companies globally, is yet to list, despite having considered it on a few occasions over the last 20 years.

8.3.3 Political Interference

Under government control, SOEs are susceptible to political interference. State officials may want to directly manage the day-to-day running of the entity or make critical decisions that concern the entity through the advisory board. They may appoint board members who do not have the skills required to run profit-making entities, who might put their political goals ahead of the company's commercial interests, or simply as a way to reward political allies—using SOEs as a source of patronage. Short-term decisions that align with the political cycle can be detrimental to the success of the entity, given the long-term nature of mining projects. This can result in the SOE operating inefficiently with low revenues, unsustainable costs, a bloated workforce, or underinvesting in exploration and development (Heller et al., 2014).



8.3.4 Lack of Transparency

The International Monetary Fund (2018) defines transparency as encompassing timely, relevant, reliable, frequent, clear, and open information about the entity. Transparency can not only deter corruption, but it can also increase the possibility of an SOE acquiring external financing and partnerships, as well as increase public trust (Extractive Industries Transparency Initiative [EITI], 2020b).

The Resource Governance Index 2021 indicates that SOEs continue to lack transparency, especially when it comes to commodity sales and corporate governance (Natural Resource Governance Institute [NRGI], 2021a). A lack of transparency breeds corruption. It has resulted in revenues from SOEs being diverted to secret accounts (NRGI, 2019) to benefit a few individuals and a general loss in SOE efficiency. SOEs that take on additional roles, such as investing in socio-economic activities like building infrastructure, create additional governance risks. These expenditures are made off-budget and escape parliament's oversight; as such, they become a challenge to monitor (EITI, 2020a). On the contrary, evidence shows that state entities with no corruption can match the performance of private entities (Baum et al., 2019).

Despite most countries having provisions in their domestic law that relate to transparency (such as the Glass Accounts Law in Mongolia [Namkhajantsan, 2022]) and, in some cases, requirements to comply with the EITI, their commitment to transparency appears partial at best. This can be attributed to political interference and/or a lack of political will to hold an SOE's management and board to account.

8.4 Conditions for the Successful Implementation of Commercial SOEs

Below are key recommendations for governments that are considering introducing, expanding, or reforming commercial SOEs in their mining sector. The list draws on lessons about the design, governance, transparency, and accountability of SOEs from an extended literature review, as well as practical experience from several SOEs in operation.

8.4.1 Clear Objectives

SOEs should have clear, well-defined objectives that are stipulated in the laws and regulations of a country. These objectives should not be conflicting. Carrying out commercial roles while performing regulatory functions may be a challenge. The SOE may,

for example, act as a “gatekeeper” by awarding itself mining licences only to keep them idle and sell them to private investors at a premium in the name of performing its licensing function—as the Democratic Republic of the Congo’s Gecamines has often done (The Carter Center, 2017; Manley & Wake, 2015). Where possible, the SOE should focus on its commercial objective, and a separate entity should be put in charge of other non-commercial responsibilities. This is the case for Codelco.

Box 8.3. Comparing the mandates of Codelco and Erdenes Mongol LLC

Codelco

Codelco does not engage in distributing its revenues to the Chilean economy; rather, it gives money to the state to support the development of socio-economic activities (Odendal & Dolo, 2018).

Erdenes Mongol LLC

On the other hand, Mongolia’s Erdenes Mongol LLC, as in the case of Morocco’s OCP, is responsible for licensing, marketing the sector, and managing the state’s equity interest through its subsidiaries. It has 15 subsidiaries pursuing different objectives (Mongolia EITI, 2021). Most of its subsidiaries are in joint venture partnerships with private investors, while some fully own the mining licence. It also carries out business outside the mining sector in hospitality, infrastructure, and power generation.

Despite the many roles and subsidiaries, the entity has only been profitable³⁴ in 3 fiscal years (with revenues from those years totalling USD 12 million) and had accumulated debt worth USD 260 million by the end of 2019 (Bauer & Namkhajstan, 2019). Erdenes Mongol LLC’s low profits have been attributed to quasi-fiscal expenditures such as infrastructure (Ayushsuren & Bauer, 2022). The quasi-fiscal expenditures have raised debt and liabilities for Mongolia relative to its profitability.

8.4.2 Adequate Technical Capacity

The SOE should have the technical resources to carry out its objectives. In case of limited technical capacity, joint venture partnerships such as the partnership between the Government of Botswana and the De Beers Group (n.d.) could serve as an option for the state to gain expertise from the private sector. The SOE could consider entering into risk service contracts with contractors to develop the resource in exchange for a fee for service. The advantage is that all profits go to the state.

³⁴ Most of the profit is attributed to the Tavan Tolgoi subsidiary.



Countries could also require private mining companies to partner with local entities to ensure that SOEs have a reliable supply of local know-how and skills in order to carry out commercial operations in the future. Countries can set up innovation centres at local universities and introduce a curriculum to increase local capacity to develop the mining sector.

Alternatively, the state mining company should focus on those objectives that can be presently met as they continue to develop expertise (i.e., starting with one mining licence, mineral, or one aspect of the value chain, such as extraction, before expanding). For example, both Peru and Chile plan to establish state-owned mining companies exclusively for lithium. This should allow them to develop deep expertise in the production and sale of lithium rather than having to be familiar with multiple minerals. This could be a good option for countries looking to assert greater control over technology minerals.

8.4.3 Sustainable Financing Structure

The SOE should have a healthy financial structure to carry out its objectives. The mining sector is cost intensive, with large capital requirements at the start of a project and a continuous need for reinvestment to maintain production. There is a long lead time between the construction of a mine and when revenue from mineral sales is generated. Given the volatility of commodity prices, early revenue projections are also uncertain. There could be periods with little or no revenue transfers to the state coffers in the early years of production or during a downturn in commodity markets.

The SOE may need funding from the financial market. To be eligible for funding, the SOE's credit rating should be sound, and the project's return should be sufficient to pay back the capital injected. Outside of capital markets, the last recourse is state funds. But it can be difficult for the SOE to fully rely on capital from the state, which itself is often in debt.

It is important for the SOE to operate efficiently to ensure that it can pay back its debt. Mongolia's Erdenes Mongol LLC debt levels increased four times from 2019 to 2021. This increase in debt has not been matched by an increase in profitability (Ayushsuren & Bauer, 2022). The SOE may be required by financial institutions to meet certain international standards on transparency, financial reporting, and auditing to ensure it operates efficiently.

SOEs should have a flexible strategy for cash transfers and dividend payments to the state depending on the mining cycle—for example, reducing the amount of revenue the state is entitled to receive from the SOE when it is undergoing expansion or during low commodity price cycles. In 2016, Argentina's SOE, YPF, incurred a loss of over USD 1 billion but still declared dividends of USD 602 million (International Monetary Fund, 2020). Excessive dividend payments deprive the SOE of cash flow to operate. In 2019, for example, a new law was introduced to phase out Codelco's mandatory contribution to the military (Sherwood, 2019).

Box 8.4. Codelco's financing structure

With a high S&P credit rating, as of 2021, Codelco funds its projects mainly from international bonds (Codelco, 2021). Codelco also turns to the state for funding, especially where overborrowing from the debt market could affect its investment grade and balance sheet (Cambero, 2015). In 2015, when Codelco was hit with low copper prices and faced delays in expansion, the government committed to returning the USD 1 billion it had received from Codelco and USD 3 billion through a treasury debt (Reuters, 2015).

8.4.4 Independent and Professional Board

The SOE advisory board should be composed of independent and professional board members. Board members are responsible for steering the SOE in the right direction. They are responsible for making critical decisions concerning funding, dividend payouts, and the general operations of the entity. Financiers are interested in the profile of board members when deciding whether to fund the entity.

It is important for the law to be clear on the competency, term, and responsibilities of the board members. The board should also be independent (no conflicts of interest) and representative of all stakeholders, including civil society. Board members should be vetted publicly.

Box 8.5. The board structures of Codelco and Erdenes Mongol LLC

Codelco

Codelco's board consists of nine professionals. Three are appointed by the president, four by the Council of High Public Administration, and the remaining two are representatives from the Federation of Copper Workers and the National Association of Copper Supervisors (Codelco, 2022a). The board's responsibilities include submitting Codelco's budget to the Ministry of Finance, consenting to transfer profits to the treasury, and approving loans. The board is also in charge of the appointment and removal of the entity's executive president (Codelco, n.d.).

The board underwent several changes to reduce political interference and to ensure that it has a long-term view. The term for members was changed to 4 years, as opposed to relying on the presidential cycle. Other changes include increased professionalism of the members and removing representation of government officials (Bande, 2011).



Erdenes Mongol LLC

Erdenes Mongol's board comprises six senior government officials and three independent members (Mongolia EITI, 2021). While the law mandates that independent members be selected by non-governmental organizations, this is not the practice. The board is mandated to approve the formation of subsidiaries, including their respective boards. The board makes decisions concerning dividend payouts and reinvestments.

The board has been the subject of political interference, resulting in a high turnover of board members that aligns with political cycles. Politicians have also bypassed the board and made decisions regarding the subsidiaries (Bauer & Namkhajjanstan, 2019).

8.4.5 Regular Audits

The law should provide for SOE audits, and these requirements should be enforced. Audits are an effective monitoring tool. Different types of audits are relevant for SOEs, including cost audits, performance audits, and financial audits. Audits are also useful in identifying risks, which can assist in establishing controls. Auditors need to be autonomous. While the role of auditing is undertaken by the state audit department, the state mining company should consider procuring external auditors who apply international audit standards. The audit reports should be made public.

Box 8.6. The audit policies of Codeclo and OCP

Codelco

Chile's law provides for the auditing of Codelco. Internal audits carried out by Codelco to review consultancies between 1997 and 2015 show that Codelco could be vulnerable to irregularities in contracting with Politically Connected Persons (Cárcamo et al., 2018). Codelco has since improved its standards by putting an anti-corruption system in place.

OCP

OCP is audited by external auditors in line with the International Standards on Auditing. It also has an audit and risk committee made up of the government commissioner, a chief financial officer for OCP S.A, and representatives from the central bank and the Department of Public Enterprises and Privatization. The committee meets twice a year, and it is mandated to review the risks, compliance, and control functions of the entity and advise the board.

8.4.6 Maintain Transparency and Accountability

The requirement for the SOE to be transparent should be legislated into law and enforced. Governments may consider signing up to international standards on transparency, such as the EITI or the Open Government Partnerships (OGP), to align with global transparency standards now expected by citizens and investors. Transparency should cover both the governing framework (e.g., code of conduct, anti-corruption policies, and board composition) and the financials (e.g., revenues, expenditures, and budget). *NRGI's Guide to Extractive Sector State-Owned Enterprise Disclosures* provides a useful tool for governments on “what” and “how” SOEs should disclose (NRGI, 2018).

Box 8.7. Transparency standards and obligations of Erdenes Mongol LLC and OCP

Erdenes Mongol LLC

Bound by the Law of Mongolia on Glass Account³⁵ and the EITI,³⁶ Erdenes Mongol LLC and its subsidiaries are required to disclose the following information to the public (Mongolia EITI, 2021):

- Ownership stake in all mining companies operating within Mongolia.
- Financial instruments, e.g., loans, bonds, and guarantees.
- Material³⁷ monetary transfers to the state, as well as transfers from other mining companies to Erdenes Mongol LLC and its subsidiaries.
- Financial statements and audit reports.
- Work plan, including targets, performance, and justification on excess savings.
- Procurement plan, capital expenditures, and audited procurement reports.

EITI's transparency assessment of Erdenes Mongol and its subsidiary stands at “satisfactory progress.” According to the 2020 assessment report, not all subsidiaries disclosed the above-mentioned information (EITI, 2020b). Erdenes Mongol LLC, for example, does not disclose data on production and sales (NRGI, 2021b). The last financial report was released in 2018, according to its website (Erdenes Mongol, n.d.-b). Nevertheless, the requirements for disclosure under the Law on Glass Account and the EITI have increased the level of transparency by the subsidiaries.

³⁵ The law was adopted in 2014, and it requires public entities to disclose to the public on finance-related information.

³⁶ Mongolia joined the EITI in 2007.

³⁷ The law on Glass Account defines “material” as anything above MNT 5 million.



OCP

OCP began publishing its financial statements in 2018 on its website. It also publishes its code of conduct as well as its anti-bribery and anti-corruption policies. However, it does not disclose information relating to revenue transfers to the state or disaggregated information on its sales, including buyers and the price at which the commodities are sold (NRGI, 2021c).

8.5 Conclusion

SOEs can either fully, partially, or completely fail to deliver on their objectives for resource-rich countries. Their success is mostly dependent on their internal governance framework and how it is enforced. Governance looks closely at the role of management and the advisory board in meeting the objectives of the state entity. When designing an SOE, governments should consider ex-ante the objectives, technical capacity, and the funding options available for the entity. They could also consider focusing on a single strategic mineral to build deep knowledge and expertise. Transparency is vital for the success of an SOE. Not only can it deter corrupt practices, but it also helps to build trust and buy-in from the resource owners—the citizens. Resource-rich developing countries typically have limited financial resources. Channelling money into the state entity means less funding directed to other sectors, such as education and health. The onus should be on the SOE to deliver benefits for its citizens.

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Chapter 9. Variable Royalties: An answer to volatile mineral prices?

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In many mineral-rich countries, variable royalties represent a potential improvement over fixed-rate royalties. They provide more flexible revenue than fixed-rate royalties and are easier to implement than profit-based or cash flow-based taxes.

To tax mining companies, governments regularly face two challenges. The first is that because many mining companies are multinationals, some may engage in profit-shifting and tax-base erosion. As this handbook makes clear, this is a particular challenge for tax officials in many developing countries.

The second challenge is that mineral prices have been volatile and are likely to continue to be as the global economy transitions to low-carbon energy use.³⁸ This energy transition is revealing itself to be both hungry for metals and making some metal markets highly volatile. This volatility comes from both the changing use of metals as manufacturers innovate and switch between metal uses and sudden changes in supply as new deposits are found or disruptions limit the supply. Mining countries stand to benefit a great deal from the demand for their metals, but as many governments have experienced before, price volatility significantly challenges their ability to tax companies.

A variable-rate royalty, or “variable royalty” for short, appears to offer an answer. It has similarities to its cousin, the fixed-rate or ad valorem mineral royalty, a payment levied on some measure of the gross sales value of production from a mine. But unlike its fixed-rate cousin, a variable royalty has a rate that varies with some measure of mineral price or profitability.³⁹

³⁸ Particularly so for “minor metals,” many of which are “critical” to industrial processes in the energy transition (Renner & Wellmer, 2019).

³⁹ In the oil industry, governments have been levying variable royalties for decades, and some have designed production-sharing arrangements based on production or gross sales that are part of the same genus of tax types.

More complex versions of variable royalties even use operating profits as a base rather than gross revenue, and they are therefore closer to corporate income taxes than to ad valorem royalties.

A variable royalty presents a more sophisticated version of a simple fixed-rate royalty. Compared to a fixed-rate royalty, a variable royalty adjusts more to volatile mineral or metal prices. This means it generates more revenue when prices are high and less revenue when prices are low. Like fixed-rate royalties, most—but not all—types of variable royalties remain simpler to administer than taxes based on profits and can be explained in simpler language to citizens concerned with how much their country is getting from the mining industry.

Few governments actually call such taxes by the name variable royalties. They instead use a plethora of terms—from revenue tax to special mining tax to windfall tax. They have also been called “progressive” royalties or referred to as having “step-scale” and “sliding-scale” royalty rates (Natural Resource Governance Institute, n.d.). All these taxes or levies share characteristics that mean they behave in a similar way.

However, governments have not always levied variable royalties successfully. Officials have come to realize that it is important to get both their design and implementation right. This chapter reviews examples of variable royalties from 15 countries, showing what to emulate and what to avoid.

9.1 Assessment of Variable Royalties

Variable royalties can help governments improve mining revenue collection while accommodating an investment-friendly mining policy. But they need to be designed with care, accounting for mining costs and adjusted to specific commodities, in order to achieve these objectives.

9.1.1 Variable Royalties Can Improve Revenue Collection

In countries where mining revenues depend more on mineral royalties than income taxes, variable royalties could be an improvement.

As discussed in this handbook, corporate income taxes are a key component of most mining fiscal regimes. Between 2013 and 2020, mining companies that were members of the International Council on Mining and Metals paid a global aggregate of USD 185 billion to tax authorities around the world, about USD 66 billion in royalties, and USD 119 billion in corporate income taxes (International Council on Mining and Minerals, 2021).



However, in countries with poorly resourced tax administrations, royalties tend to generate more revenue than corporate income taxes. In a previous post, the authors illustrated the aggregated payments to dozens of governments and the proportion of each type of tax collected by the respective governments (Manley & Lassourd, 2019). They showed that some countries receive comparatively little revenue from profit-based taxes, instead collecting more from royalties and other types of payments from mining companies.

For these countries, royalties are particularly important. Compared with profit-based taxes, royalties are relatively simple to administer, more easily sharable with local governments, and payable almost as soon as a company extracts the ore from the ground (Otto et al., 2006), at least for the most common type of variable royalty based on gross revenue. Building on these advantages, variable royalties can increase the total revenue collected from companies by adjusting the royalty rate to a price or profitability index even when income tax receipts are disappointing. This depends, however, on the tax base and the scale that each variable royalty uses—a subject discussed later in this chapter.

9.1.2 Variable Royalties Can Accommodate Mining Investment

The flexibility of variable royalties can work in favour of mining investment. If properly designed, they collect more revenue when companies have the highest ability to pay and less in more challenging economic contexts. They can also have a stabilizing effect on the fiscal regime.

Fixed-rate royalties are often called “regressive” because, as they are based on production or sales value and do not consider costs, they do not adjust to changing profits (Otto et al., 2006). When companies make large profits, royalties only increase proportionally to gross revenue, whereas taxes based on profits or economic rents capture more of the profits. Conversely, royalties are payable even if a company is suffering losses. This can result in companies not expanding mines into high-cost areas; closing projects prematurely; and, in the extreme, not investing at all (International Monetary Fund, 2012).

This inflexibility of fixed-rate royalties pushes governments to change royalty rates often to adjust to new price levels. Although not wholly due to royalty changes, the regressive nature of the Zambian mining tax regime contributed to the government’s decisions from 2001 to 2017 to change the mining tax regime nine times following the rise and fall of the copper price (Manley, 2017). Each rise antagonized the mining companies, and each fall antagonized civil society and many voters who wanted heavy taxes on the industry. Changes also took time. By the time the government had responded to a price rise by legislating a new tax term, the price had already fallen, making the now higher rate even more burdensome for companies. Changes also created mistakes, leading to further antagonism and delays (Manley, 2021).

If calibrated correctly, variable royalties are upgrades that address the need to chase the roller coaster of prices and profits. While they are still not as flexible in relation to changing profits as profit-based taxes, they tend to be less regressive than fixed-rate royalties, as long as mining costs are not strongly correlated with the commodity price, an issue we discuss below. As variable royalties have different rates for different price or profitability levels, they should not require as many changes.

In South Africa, the current variable royalty was designed with this objective in mind. Government officials knew that there was no perfect tax policy and that a resource-rent tax, although desirable on paper, would be too complicated to implement. They came up with a variable royalty whose rate varies according to companies' profit margin (earnings before interest and tax [EBIT]) but whose base remains ad valorem: gross revenue. The South African government was aiming for a balance in tax policy between simplicity and good, efficient royalty design (H. R., SARS, personal communication, December 2022).

We also consulted tax specialists in mining companies. The general position of companies is that if the package includes a variable royalty and the overall tax burden and progressivity are acceptable given the risks of the project, they will not object. In addition, some mining companies operating in conflict-prone jurisdictions see variable royalties as easier to administer for governments with limited capacity in cost monitoring and tax auditing. One interviewee suggested that in some jurisdictions with particularly cumbersome tax court processes, a royalty is preferable to a corporate income tax, as it largely avoids disputes with government lawyers (V. M., personal communication, November 14, 2019).

Companies also care about the stability of fiscal terms (Yunis & Aliakbari, 2022). Most agree that the stability of tax terms might justify a loss of efficiency in the tax regime and would agree to pay a variable royalty that came with stronger commitments to fiscal stability. Indeed, the mining industry proposed such a variable royalty in several legal reforms in Africa in recent years: in 2014 in Cote d'Ivoire, where a version of the industry proposal was ultimately adopted; during the Democratic Republic of the Congo's 2018 mining code reform, where it was not; and in 2019 in Mali, when the government reviewed the country's mining code.

9.1.3 Variable Royalties Need to Consider Mining Costs

The specific design of variable royalties is important. If the rates are not set at the right level, and if they do not account for mining costs, they will not achieve their objectives.

Although royalties are based on sales revenue and not profit, officials still need to understand the costs of mines when designing the royalty and choosing rates to ensure



companies will be able to afford to pay it. This is not easy. Costs are often not well known at the stage of setting the tax regime for a mining company.⁴⁰

This challenge applies even more to variable royalties based on prices. The risk lies in how mining companies' costs might change in relation to prices. If operating costs closely follow prices, then a higher price does not lead to higher profits before tax. The more the rates of a variable royalty increase as the commodity price increases, the more a company is paying despite not making much higher profits.

The positive relationship between average mining costs and metal prices is commonly recognized by the industry and in academic literature (V. M., personal communication, November 14, 2019; see also O'Connor et al., 2016). To add to this literature and better understand the relationship between costs and prices, we interrogated the S&P Capital IQ Metals and Mining Database (the "S&P database" from S&P Global Market Intelligence).

We looked at two types of costs: development costs and all-in sustaining costs (made up of operational costs and sustaining costs). Typically, a company incurs development costs when developing or expanding a mine. There appears to be no correlation between development costs and the metal price.⁴¹ One reason might be that mining companies cannot easily adjust capital costs or other non-operating costs when prices change because expenditure is either planned years ahead (e.g., development and expansion) or unavoidable (e.g., interest charges). Another reason is that capital costs are reported in the S&P database with less precision than other types of costs and are typically lumped into a single year, while, in reality, they are probably spread out over several years by companies.

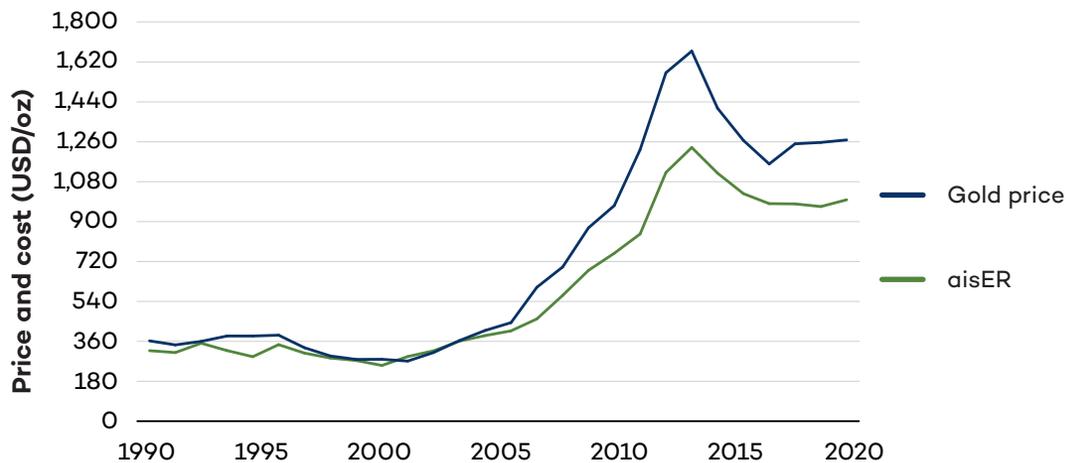
However, this picture changes for all-in sustaining costs (AISCs), which companies incur after they have developed their projects. These costs were strongly correlated with price. The reason is that cash costs, the biggest component of AISCs, are primarily made up of mining costs that vary with commodity price cycles: energy, labour costs, mining services, intermediate chemical products, and so on.

Figure 9.1 shows that prices and the average AISCs for all gold mines in the S&P database have moved together since 1991. In the gold market, prices boomed from around 2002 to 2014. We found similar patterns in the copper and iron ore markets. In all three markets, the costs of extraction rose and fell with prices, although the difference between prices and costs—profits, that is—rose too.

⁴⁰ This admittedly can make setting all types of royalties more problematic than profit-based taxes. The problem of understanding costs is effectively front-loaded for the designers of royalties. For profit-based taxes, costs have to be verified month to month, but through this repetition, learning-by-doing may help improve tax authorities' abilities.

⁴¹ In regressing year-on-year change in average development costs in the gold industry against year-on-year change in price, we found an R value of only 0.037. In other words, there is a very weak correlation between the two variables (authors' calculations using S&P Global Market Intelligence, 2019).

Figure 9.1. Prices and average global all-in sustaining costs⁴²



Note: aisER = all-in sustaining excluding royalties

This means that rates of price-based variable royalties should remain at moderate levels, as discussed further in this chapter. However, this price-cost correlation might not be as much of a problem if the variable royalty is levied on a by-product metal—for example, antimony as the by-product of some lead ores or cobalt as the by-product in the extraction of some copper or nickel ores. For a by-product, the investment decision is less sensitive to the cobalt price, and, in turn, is less sensitive to the royalty rate on this by-product. Changes to the prices of mining inputs, from tires to engineers, also generally reflect the rise and fall in the demand for its major metals—copper or nickel, not necessarily cobalt. For example, over the past 70 years, the prices of copper and nickel rose and fell in tandem, moving with the global economic cycle. The cobalt price so far has not.⁴³ These two facts give governments an opportunity to apply a heavier variable royalty to by-product metals like cobalt, which they might not be able to do with most major metals. This opportunity should, however, be assessed against the costs of extracting the by-product, so as not to distort the cost of production of the by-product itself.

⁴² Global mean AISCs not including royalties, measured as the cost in USD of extracting one unit of metal. Source: authors' calculations based on data from S&P Global Market Intelligence, 2019.

⁴³ The correlation between nickel and copper (0.7) is much closer than between either copper and cobalt (0.3), or nickel and cobalt (0.3) (Renner & Wellmer, 2019; authors' calculations based on data from S&P Global Market Intelligence, 2019).

9.2 Implementation of the Idea: Variable royalties around the world

Many governments have levied variable royalties on their mining industries. We looked at 15 examples applied to gold or copper mining.⁴⁴ We categorized these variable royalties using two factors:

1. **Royalty base:** Gross revenue (including minor deductions for smelting or transport in some cases) or some form of net revenue (operating margin, profit).
2. **Variable-rate structure:** Commodity price or some measure of profitability (operating margin, R-factor).

Table 9.1. The structure of variable royalties

		Royalty base	
		Gross revenue	Net revenue
Variable-rate structure	Mineral prices	Category 1. Bolivia, Burkina Faso, Cote d'Ivoire, Guinea gold contract, Kyrgyzstan, Mauritania, Mongolia, Myanmar, Queensland, Zambia	
	Profitability	Category 2. Niger, South Africa.	Category 3. Chile, Peru, Nevada.

Table 9.1 shows that the countries we examined fall into three categories:

- Category 1: Royalties with a gross-revenue base and a variable-rate structure based on mineral prices.
- Category 2: Royalties with a gross-revenue base and a profit-based variable-rate structure.
- Category 3: Royalties with a net-revenue base and a profit-based variable-rate structure.

⁴⁴ We included fiscal instruments that government has explicitly called “royalties” as well as other instruments that function much like a sliding-scale royalty. During our research, we also reviewed royalties no longer applied (e.g., Ghana, Zambia), as well as a proposal submitted by industry bodies during the recent Democratic Republic of the Congo mining code amendment that was not ultimately adopted.

We excluded from the survey royalties that have a variable-rate structure based on production levels, annual production value, or cumulated production. These structures are relatively common in the petroleum sector, but we only found one instance in the mining sector.⁴⁵ The appeal of variable royalties is their response to price changes or adaptability to mines with different costs. Production-based royalties do not provide this flexibility.

9.2.1 Category 1: Royalties with a gross-revenue base and a variable-rate structure based on mineral prices

Category 1 royalties are the simplest form of variable royalties. Their rate varies based on mineral prices defined in law or regulation, and their base is annual, quarterly, or monthly gross revenue, in some cases allowing the deduction of smelting or transport expenses (a common element of royalties referred to as the “net back”).

The designers of some of the examples in this category took a conservative approach, with rates that vary between 2% and 6% across the price bands. These rates are close to the rates found in fixed-rate mineral royalties around the world. If calibrated correctly, these royalties are unlikely to make a major dent in profits, but they also will not deter investors who worry about their costs increasing as prices rise.

However, our survey of variable royalties revealed a common challenge. Having set the prices and rates of bands in their variable royalties, some governments have found that these bands were either too high or too low compared to subsequent prices. The resulting effective rates have been either the very highest or the lowest of the variable royalty throughout much of the price cycle.

An example of setting bands too low is the Bolivian royalty. Given historical prices, the applicable rate ends up being the highest rate in the range. The Bolivian government included a price-based royalty in the 2007 revision of the mining law, with a range of 4% to 7% when the gold price was between USD 400/oz and USD 700/oz. Since then, gold prices have been much higher than USD 700/oz, and the applicable rate has remained at the maximum rate of 7%. In effect, this has behaved as a fixed royalty on gross-production value. Similarly, the royalty system in Queensland, with the upper limit of the highest price band at USD 890, has also effectively behaved as a fixed royalty of 5% since 2009.

⁴⁵ In the mining sector, the Canadian Northwest Territories impose sliding-scale royalties based on the value of production, where the maximum rate of 5% is reached when the production value is equal to or higher than CAD 45 million per year (Government of Northwest Territories, 2022). This royalty seems designed to encourage medium-sized mines in the province rather than to maximize revenue collection across industrial mines. In Michigan, in the United States, the state metallic mineral royalty rate ranges from 2% to 10.5%, depending on the sales value per tonne (Government of Michigan, n.d.).

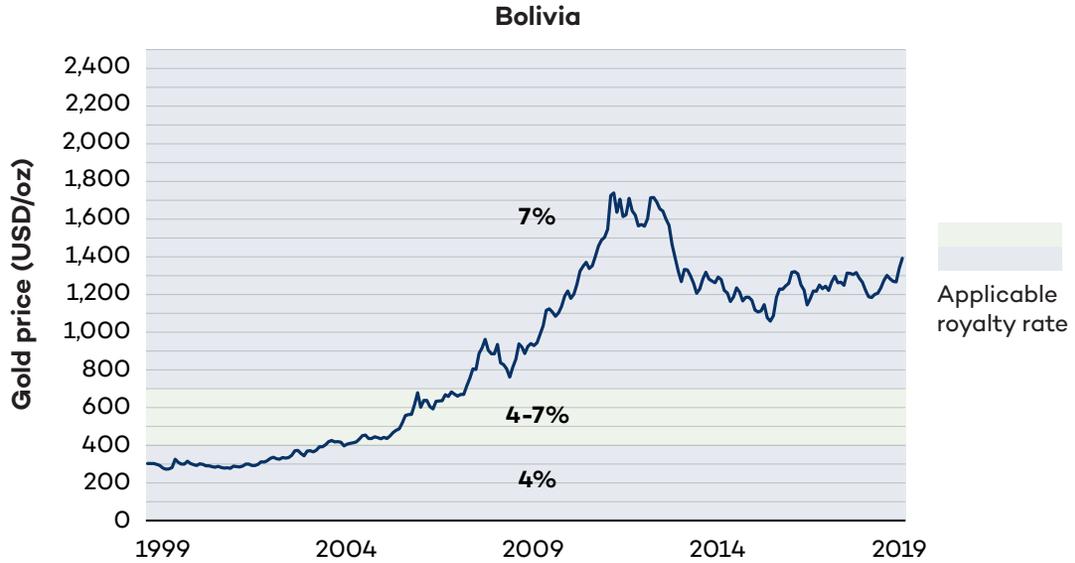
Conversely, an example of setting bands too high is the Kyrgyz variable royalty. The Kyrgyz government levies a variable royalty on all but one of its gold mining companies—called the revenue tax.⁴⁶ Figure 9.2 shows that for most of the last 20 years, the international gold price has been below USD 1,300 per ounce, the lowest band, with an applicable royalty rate of 1%. Only since 2020 have gold prices reached levels that have triggered higher royalty rates.

The Myanmar government levies fiscal regimes with a mix of legislation and contracts with companies. Contracts with miners include various production-sharing arrangements, in addition to a fixed-rate royalty. One example is the China Non-Ferrous Metal Mining Group-owned Tagaung Taung mine, one of the largest mines in the country. The government’s share moves between 1% and 12% with the price of nickel. The main difference between the variable royalties used in other countries and this production share is that the Myanmar state company, representing the government in the production share, has the option to collect the production in-kind as the physical concentrate of nickel, zinc, and lead or its monetary value as a cash payment.

Figure 9.2. Category 1 examples: Mauritania, Bolivia, Kyrgyzstan



⁴⁶ The largest—Kumtor, currently owned by Centerra—operates under a contract that does not use a variable royalty.

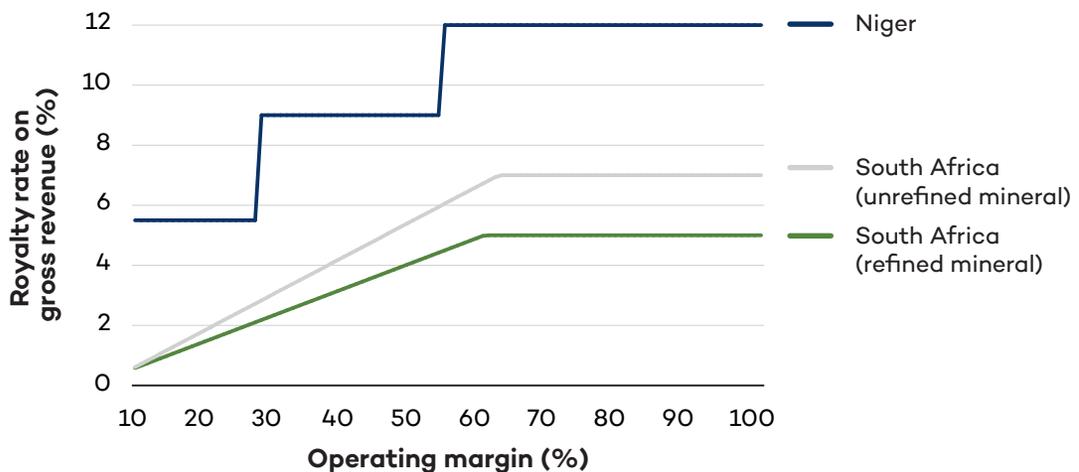


Data source: Fleming et al., 2019; Index Mundi, 2022. See <https://www.iisd.org/system/files/2022-07/appendix-sliding-scale-royalties.xlsx>.

9.2.2 Category 2: Royalties with a gross-revenue base and a profit-based variable-rate structure

The second category includes royalties that are also based on the gross revenue of a mine, but their rate varies according to a measure of profitability. For most of the variable royalties in this category, this profitability measure is the operating margin. While exact definitions vary, the operating margin is typically defined as the ratio of EBIT to gross revenue. In most cases, we found EBIT to be gross revenue minus operating costs, depreciation of capital expenditure, and production-related fees and taxes—excluding financing costs and income taxes. Financing costs are typically some of the most difficult to verify, so excluding them makes it easier for a tax authority to verify the operating margin of a taxpayer (Devlin, 2018).

Figure 9.3. Niger’s and South Africa’s variable royalty regimes



Data source: Fleming et al., 2019; Index Mundi, 2022. See <https://www.iisd.org/system/files/2022-07/appendix-sliding-scale-royalties.xlsx>.

Because these variable royalties are based on gross sales, their maximum percentage cannot be too high; otherwise, it could become unbearable for some mines. Figure 9.3 illustrates how the two provisions apply at different levels of operating margins. The Niger regime adopts an aggregate approach, with the rate increasing in steps at operating margins of 20% and 50% and applying to the whole operating margin. The South African royalty uses a formula to set a royalty rate that increases linearly with the operating margin—a “sliding scale.” There is no minimum rate, so the royalty rate increases from 0% to a maximum of either 5% or 7%, depending on whether the taxpayer is selling refined or unrefined minerals. The maximum is reached just short of an operating ratio of 60%.⁴⁷

⁴⁷ From 1987 until 2006, Ghana had a similar type of royalty, but with higher rates, set by a formula between a minimum of 3% and a maximum of 12% for operating margins between 30% and 70%.

9.2.3 Category 3: Royalties with a net-revenue base and a profit-based variable rate

The third category includes royalties for which both the royalty base and the variable-rate structure depend on a measure of operating profit. This category is related to variable profit taxes; they are only considered royalties because they are called royalties by their governments or imposed in lieu of a mineral royalty as a specific tax on mining activity. In both Peru and Chile, the variable-rate structure is based on an operating margin, which is defined as the ratio of operating profit or operating income to gross revenue. This operating profit is defined in slightly different ways in different countries but, in both cases presented here, is relatively close to the accounting definition of EBIT. No country seems to use the alternative measure of operational profit, which would be earnings before interest, tax, depreciation, and amortization (EBITDA).⁴⁸

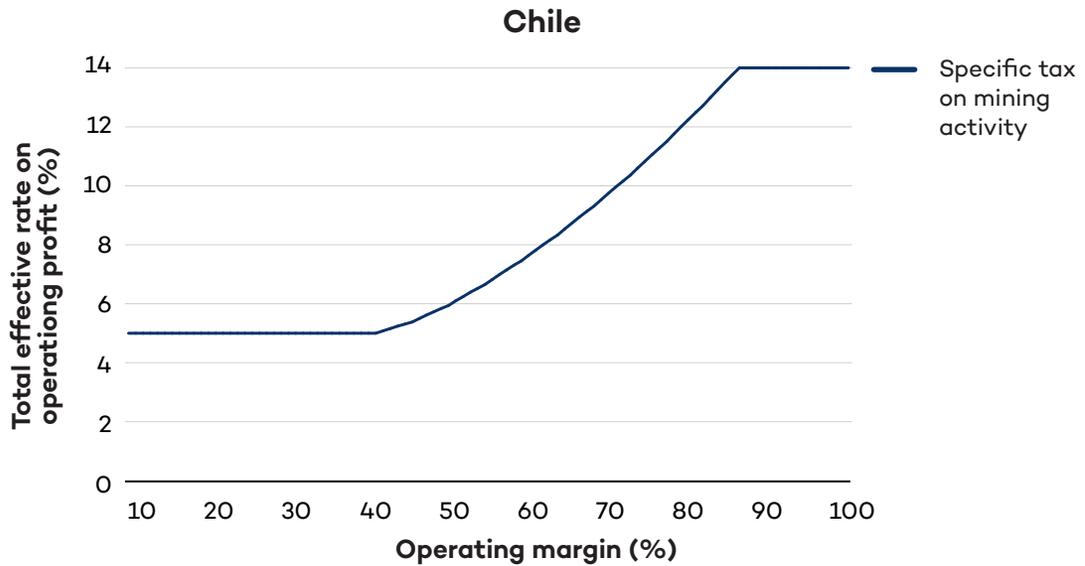
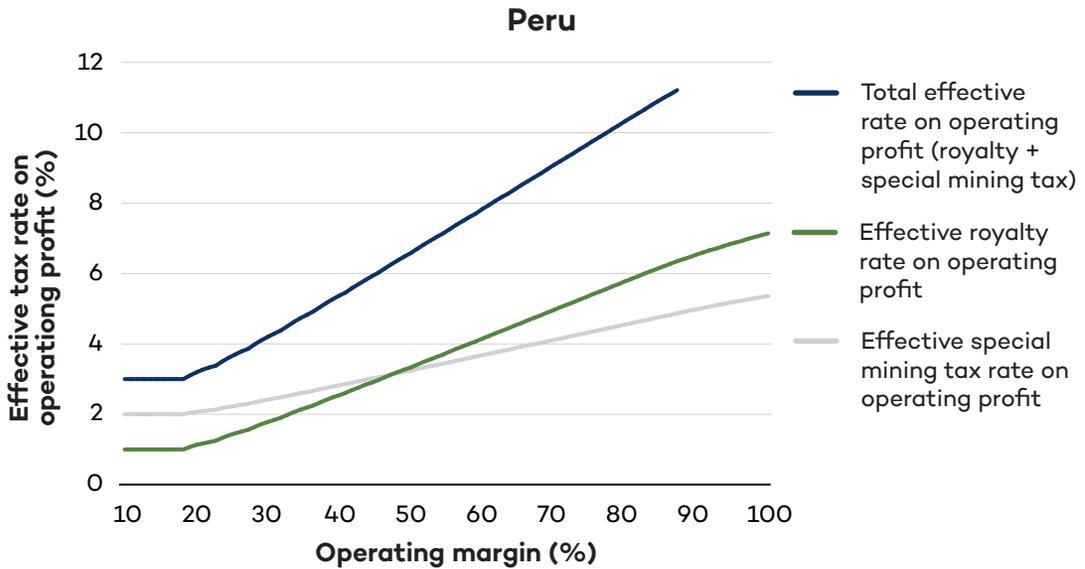
Peru applies two taxes on large-scale mineral extraction that both function as variable royalties: a modified mineral royalty and a special mining tax. The royalty rate ranges from 2% to 12% and applies marginally to each 5% band of operating margin. The special mining tax follows a similar structure, with higher rates for companies that have signed stability agreements. Figure 9.4 illustrates the variable effective Peruvian royalty rate on total operating profit (Acosta et al., 2019).

In Chile, there is no fiscal instrument called “royalty,” but the state imposes a “specific tax on mining operations,” defined in the income tax law as a tax on operating profit, with two sliding scales depending on the project size.⁴⁹ The tax applies marginally to different bands of the operational profit margin. Figure 9.4 shows the net effective rate of this tax on mining companies’ operating profits as the operating margin increases, from a minimum of 5% to a maximum of 14% for mines producing over 50,000 tonnes of copper per year.

⁴⁸ As argued in Section 9.1, one implication of choosing EBITDA over EBIT is the simplification of the tax base. Depreciation and amortization require extra effort for tax auditors to verify, and the high value of these costs means that a small proportional difference in their valuation can significantly reduce the available tax base. Challenges to verifying depreciation and amortization are particularly great if the tax authority starts to monitor a mining company only once production starts—after most development costs have been expended.

⁴⁹ There is a smaller scale for mines producing between 12,000 and 50,000 tonnes per year and an exemption for smaller mines.

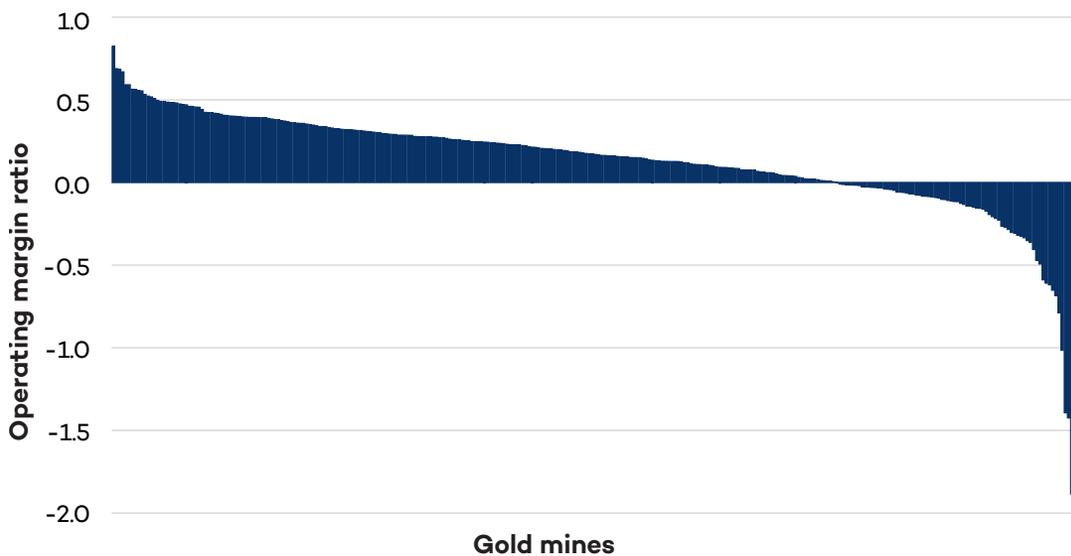
Figure 9.4. Operating profit-based royalties/taxes in Peru and Chile



Source: Fleming et al., 2019. See <https://www.iisd.org/system/files/2022-07/appendix-sliding-scale-royalties.xlsx>.

Like price-based royalties, royalties with profit-based rates also need to be correctly calibrated. Variable royalties from categories 2 and 3 should be calibrated against the range of profit-margin ratios of mines. Indeed, profit-margin ratios are generally much lower than 100%. Mines' profitability will vary from year to year, but in most years, there will be very few mines with profit-margin ratios above 50%. Figure 9.5 shows the distribution of profit-margin ratios in 2018 for the gold mines in our database. Many will also have negative margins, especially in the early years of a mine's life, when depreciations for capital expenditures are high. Against this distribution, the rates of South Africa's royalty seem well adjusted, from a 0% to a 60% operating-margin ratio. However, this may not be the case for Chile and Peru. The maximum rate of the special mining tax is only reached at a level of 85% of the operating-margin ratio in Chile, an almost implausible scenario, and 100% in Peru, a mathematically impossible scenario.

Figure 9.5. The range of operating-margin ratios for gold mines, 2018



Data source: Fleming et al., 2019; S&P Global Market Intelligence, 2019.

Note: Each vertical bar represents the ratio of operating profits over gross sales for a single mine—the thousands of mines included in the S&P Global Market Intelligence database are here sorted by level of operating-profit margin.

The header features a dark blue background with white and light blue text representing financial data, including percentages like 16.2%, 0.003, -0.23%, 0.0024, 0.003, 0.08%, and 0.08%.

9.3 Politics of Reform: Introducing a variable royalty in a mineral fiscal regime

There is no specific approach to introducing variable royalties into a country's mineral fiscal regime. However, government officials can optimize the process by taking particular steps in three areas: policy objectives, design, and calibration.

9.3.1 Policy Objectives

First, the role of a variable royalty should be clear from the outset, as it will determine what type of instrument to choose and its place in the overall mining fiscal regime. If it is to compensate for the depletion of the non-renewable mineral reserve, it may be replacing a fixed-rate royalty. If its main objective is to provide a share of windfall profits, it might be an addition to an existing fixed royalty and include a 0% minimum rate at low prices so that its addition does not make the overall fiscal regime overly regressive.

Second, any variable royalty should be considered as one part of the entire fiscal regime. The royalty should be applied to help ensure the entire fiscal regime meets the government's policy objectives for the sector. For example, if the objective is to attract investment, then the fiscal regime should be progressive and offer attractive post-tax returns to investors. Some types of variable royalties will make the regime more progressive than others. Policy-makers should also consider the effect the royalty has on other parts of the fiscal regime—for example, if companies are allowed to deduct royalty payments from their taxable corporate profits.

Third, in introducing a variable royalty, the government should communicate with the public. As a specific and significant tax on mineral production, royalties are often the most visible part of mining companies' fiscal obligations, especially when they are redistributed to local governments or development projects. They receive a lot of scrutiny from parliaments, the media, and civil society organizations. Officials should think about how the change will be understood by the public.

Last, levying a variable royalty will disrupt existing mines. Officials might consider the potential for the tax's stability. For instance, they could exempt existing mines from the new royalty for a period; they could compensate companies by eliminating another tax; or they could discuss with companies how introducing a variable royalty might serve both parties' interests. For example, they could argue that a variable royalty will stop future governments from making sudden changes to the royalty regime.

9.3.2 Design

There are four design choices to establish the overall structure of a variable royalty.

Design choice 1. Tax-base category: Gross or net revenue

In the previous section, we explained that the variable royalties that governments have chosen in the past come in three categories. The first design step is therefore to choose which of these three categories is most suitable. The design and implementation of royalties increase in complexity from category 1 to 2 and then to 3, but they are also increasingly progressive, an important feature for many governments. The policy objectives defined before, and the considerations summarized in Table 9.2, will help determine which category of royalty to select from.

Table 9.2. Design features of different categories of variable royalties

	Reliability at low profit levels	Progressivity as profits change	Tax-base simplicity	Variable-rate structure simplicity	Need to update the variable-rate structure periodically
Category 1	Good	Poor	Good	Good	Yes
Category 2	Poor/fair	Fair	Good	Fair	No
Category 3	Poor	Good	Poor	Poor	No

Design choice 2. Tax-rate application category: Aggregate, marginal, or sliding, based on a formula

Officials sometimes do not appropriately consider the choice between the aggregate and marginal application of royalty rates on the royalty base. Most price-based royalties in category 1 use an aggregate approach—the rate applies to the full royalty base. So companies face steep changes in payments around the limits of the price bands, also known as “cliff edges.” This could incentivize companies to report lower sales prices to remain in the lower band (Steel, 2018). A marginal approach removes this problem, as the increased rate in a price band would only apply to the share of the value of production attributable to the price above the limit of the previous band.⁵⁰ But the rates then need to increase steeply in each band to achieve the same overall objective. As a result, the marginal approach is more complex and much more difficult to communicate to the public.⁵¹

⁵⁰ This also applies to category 2 royalties—see Figure 9.3 comparing Niger and South Africa’s royalties as a function of mines’ operating margins.

⁵¹ People subject to progressive personal income taxation may be familiar with the marginal approach, which is used in many developed economies but less often in developing countries.



Our survey shows that the marginal approach is indeed more common for operating profit-based royalties (category 3) than price-based royalties (category 1). For instance, in Chile, for each band of operating margin, the rate applies only to the operating profit of that band; that means that if the operating margin is 52%, a 13% tax applies when the operating margin is higher than 50% and lower than 55%, but only to the amount of the operating profit equal to 2% of gross revenue (52% minus 50%). Lower rates apply to lower tranches of operating profit. Because category 3 royalties are already relatively complex, the marginal approach may be a less costly feature than category 1 or 2.

Rather than a purely marginal approach, several countries have adopted a sliding scale based on a formula that determines the applicable rate of royalty within a range of royalty rates bound by minimum and maximum rates—for example, Bolivia, Queensland, and, indirectly, Myanmar with the Bawdwin PSC for category 1 royalties or South Africa for category 2. These formulas vary in complexity—Bolivia’s is the simplest, and Myanmar’s is the most complex—but they offer the economic neutrality of the marginal approach in a way that may be slightly more easily understood by the public.

Design choice 3. Future adjustments

A potential challenge for price-based variable royalties (category 1) is the long-term increase in prices that do not reflect a temporary windfall but the normal effect of inflation that affects both mineral prices and costs. Over a long period of time, original price bands are unlikely to reflect contemporaneous market conditions, and the top royalty rates become applicable for prices across the whole price cycle, as the examples of Bolivia and Queensland above show. How long a period of time? We analyzed the difference over the last 35 years between nominal monthly gold prices and two inflation-adjusted price series—one based on 1986 prices and the other based on 2019 prices. We observed that nominal and real prices track each other relatively closely for about 10 years and diverge significantly after 15 years. However, the historically high rates of inflation many countries are experiencing at the time of writing will quicken this divergence, so governments should be ready to review their variable royalty schedules soon.

To address this challenge, governments might either create a rule that automatically adjusts price-based royalty bands yearly with a measure of inflation (such as the U.S. Consumer Price Index⁵²) or regularly legislate changes to the royalty bands. Despite the advantages of the former approach—it reduces work by legislators and the risk of political entanglements—this type of adjustment seems quite rare for price-based royalties: we only found it in one instance, in a mining agreement signed by the Government of Guinea in 1993.⁵³ And even when that agreement was renegotiated in 2016, the price bands were significantly increased to reflect higher gold prices. The latter type of adjustment, on the other hand, requires governments to be careful: if a government revisits variable royalties too often, it undermines

⁵² <https://www.bls.gov/cpi/>

⁵³ See <https://resourcecontracts.org/contract/ocds-591adf-3612985124/view#/pdf>

one of the objectives of the royalty—to provide a stable fiscal regime. Most of the price-based royalties in our sample have been legislated in the last 15 years, so we have not been able to observe how often governments need to revisit the price bands.⁵⁴

Design choice 4. Calibration

Once the broad design is chosen, the fourth task is to calibrate the parameters of the variable royalty. For price-based (category 1) royalties, what rates should apply at different price levels or within different price “bands”? This choice determines the overall level of the royalty and its flexibility to price or profits (depending on the tax base chosen). The calibration should be done mineral by mineral to account for the specific price and cost dynamics of each mineral market. As discussed above, understanding the evolution of costs in different mineral markets is critical. Governments should design variable royalties with very progressive bands to capture a share of potential price windfalls but with a ceiling at a reasonable rate because eventually, costs tend to follow prices.

Calibrating a price-based royalty ideally requires understanding how the mineral price might move in the future. However, there is no way to know this for sure—attempts to accurately forecast most commodity prices have so far been unsuccessful. We therefore think calibrating variable royalties against some period of historical prices is most practical. This process might look like this:

1. Measure a suitable history of mineral prices, at least 10 years, to cover a large cycle.
2. Set one price-rate band to correspond to the median price in this history, then set the highest and lowest bands.
3. Choose the number of intervening bands. Fewer bands are simpler, but more bands allow policy-makers to fine-tune their variable royalties and reduce the sharpness of cliff edges between bands. In practice, there appears to be no set number; examples vary:
 - i. Category 1. The number of bands ranges from 3 (e.g., Burkina Faso) to 12 (Kyrgyzstan). A typical number is around 5.
 - ii. Category 2. The two examples we found both had 3 bands each, including a smoothed, formula-based central band for South Africa.
 - iii. Category 3. Our three examples ranged from 7 (Nevada) to 12 (Chile) to 17 (Peru).
4. Set rates for each band. One way to approach this is to set rates based on what is commonly seen elsewhere in the world (i.e., from 2% to 10%, with some exceptions in some countries/commodities). Ideally, the rates should be set based on an economic model⁵⁵ to create the desired effective tax rate and flexibility for volatile prices.

⁵⁴ Only the Government of Zambia has reviewed the price bands of its royalty, but more to reflect short-term market changes and possibly public debt pressures than the natural long-term effect of inflation.

⁵⁵ See Natural Resource Governance Institute for economic models:
<https://resourcegovernance.org/economic-models>



For profit-based royalties in categories 2 and 3, the calibration should be based on a range of realistic profit-margin ratios, typically between 0% and 60%. Rates can be more progressive than for category 1 royalties and will not need any adjustment. To adjust the rates to each band of profit-margin ratios, it is recommended to use an economic model and determine an appropriate relationship between pre-tax and post-tax profit.

9.4 Conclusion

Some governments already use variable royalties, but others might benefit from levying one. Many variable royalties add progressivity to a fiscal regime while keeping the tax base relatively simple to verify. They could be a key fiscal instrument for countries that already rely on royalties for mining revenue collection. And, if properly calibrated, they can accommodate companies' priorities by providing a visible upside to governments during high prices, protecting cash flows during periods of low prices, and creating more stability overall by reducing the pressure to renegotiate fiscal terms along commodity price cycles.

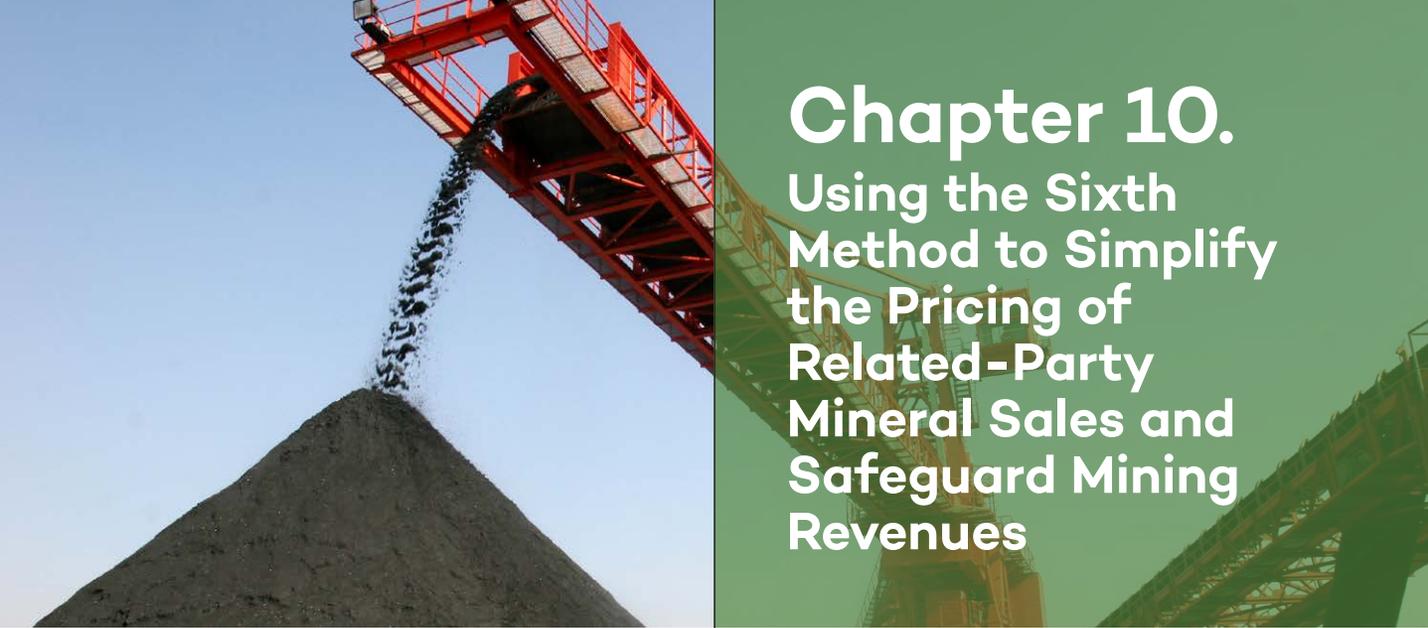
In designing a variable royalty, governments can choose among three types with varying degrees of progressivity but also complexity. We propose a four-step design process: tax-base category (gross or net revenue), tax-rate application category (marginal, aggregate, or sliding scale), future adjustments, and calibration.

However, variable royalties all require thinking about the economics of mining in the design phase. Several variable royalties surveyed were poorly calibrated to the price cycle of a metal market or did not sufficiently account for cost changes. Applying variable royalties to by-product metals, many of which are critical minerals for clean energy industries, might be easier and more successful than applying them to major metals because the price of a by-product generally does not follow the general cost cycle of the mining industry.

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Chapter 10.

Using the Sixth Method to Simplify the Pricing of Related-Party Mineral Sales and Safeguard Mining Revenues

IGF and ATAF with inputs from Governments of Ecuador and Zambia

10.1 Introduction

In the mining sector, government revenue depends on mineral products being valued and priced accurately. However, pricing is not always straightforward. It may be complicated by the different quality or grades of mineral products, the stages of beneficiation, and contractual terms. These factors are further complicated in the case of related-party sales, which may create an incentive for some companies to set artificially low prices to reduce taxable income in the source country and shift profits offshore.

The international standard to respond to this risk is to apply the arm's-length principle, which requires the price of the controlled transaction (i.e., between related parties) to be similar to a comparable transaction between independent parties. According to the United Nations (2021a) and Organisation for Economic Co-operation and Development [OECD] Transfer Pricing Guidelines (TPGs) (2022), there are five recognized transfer pricing methods that can be used to determine whether a transaction is consistent with the arm's-length principle. These methods generally require that tax authorities have access to substantial information from taxpayers and their affiliates, as well as comparable data, not to mention international tax expertise. These administrative challenges—and the finite, non-renewable, and often publicly owned nature of mineral resources—have prompted some resource-rich developing countries to look for alternatives.

The Sixth Method approach was developed by resource-rich countries in Latin America as a measure to address abusive tax-planning schemes in transactions involving raw materials or commodities. By using commodity prices quoted on a relevant exchange (e.g., the London Metals Exchange [LME]), often with few or no adjustments, it sought to provide a clear and transparent standard for determining the price of related-party mineral sales that would be easier for tax authorities to apply and less vulnerable to tax avoidance. Other approaches include administrative pricing, which was pioneered by Norway in the oil sector, and safe harbours, most recently used by the Republic of Guinea with respect to bauxite.

The 2017 OECD TPG endorsed the use of quoted prices as a basis for determining related-party mineral sales. Specifically, the OECD TPG endorsed the use of quoted prices for applying the Comparable Uncontrolled Price (CUP) method. This raises the question of whether there is still a need for the Sixth Method. The CUP method requires that the conditions of the transaction from which the quoted price is obtained are comparable to the related-party transaction. Consequently, taxpayers must adjust the quoted price for any differences in the quality and grade of the mineral, period of sale, timing, and terms of delivery, as well as other factors, such as transportation, insurance, and payment terms. While there are different versions of the Sixth Method, in many cases, they require few or no adjustments, making them simpler to implement and harder to manipulate.

This chapter aims to provide greater insight into the workings of the Sixth Method, particularly for minerals that are harder to price. It starts by briefly explaining how the method works. It goes on to set out the challenges and opportunities associated with the Sixth Method, the different legislative and regulatory approaches that countries have taken, and the practical experience of countries implementing the Sixth Method. Finally, it discusses two alternative pricing approaches: (i) administrative or norm pricing and (ii) the use of safe harbours based on a version of the Sixth Method or CUP method, depending on the comparability adjustments allowed.

10.2 A Brief Overview of the Sixth Method

The Sixth Method originated in Argentina in 2003 when the government was seeking to evaluate the sale of raw materials to related parties in countries with lower tax rates. It is designed specifically to limit the risk of transfer pricing abuse in commodity transactions. Argentina's legislation requires that taxpayers selling commodity products to offshore related parties use the quoted price of the traded goods on the date the goods are shipped unless the price the related parties agree to is higher than the quoted price.



Many resource-rich countries have followed Argentina's lead, especially in Latin America. The Sixth Method has been legislated by Bolivia, Costa Rica, the Dominican Republic, Guatemala, Honduras, Peru, and Uruguay.⁵⁶ Outside Latin America, the Sixth Method has also been adopted by Zambia, Malawi, and India (Grondona, 2018). Each country takes a slightly different approach, resulting in no single version of the Sixth Method. However, they all use quoted prices as a starting point for determining the price of related-party mineral sales.

A quoted price typically reflects an agreement between independent buyers and sellers for a specific type and amount of a commodity traded under certain conditions at a certain point in time. In Zambia, for example, taxpayers are required to use quoted prices on the LME—or the London Metal Bulletin if the LME is unavailable—to set the price of base and precious metals (see Box 10.1). There is also an option for the Commissioner General to approve an alternative source of market price. The advantage of a quoted price is that it can be observed by the tax authority and taxpayer, as opposed to the actual sale price, which is vulnerable to manipulation.

Box 10.1. Zambia specifies the source of quoted prices to be used for applying the Sixth Method

“(14) For the purposes of subsection (13), “reference price” means -

- a. the monthly average London Metal Exchange cash price;
- b. the monthly average Metal Bulletin cash price to the extent that the base metals or precious metal prices are not quoted on the London Metal Exchange;
- c. the monthly average cash price of any other metal exchange market as approved by the Commissioner General to the extent that the base metal price or precious metal price is not quoted on the London Metal Exchange or Metal Bulletin; or
- d. the average monthly London Metal Exchange cash price, average monthly metal market exchange cash price approved by the Commissioner General, less any discounts on account of poor or low quality or grade.”

Source: Zambia Revenue Authority [ZRA], 2018.

⁵⁶ Ecuador recently modified its version of the Sixth Method to be more closely aligned to the CUP method, using reference prices as the starting point.

10.2.1 Differences Between the Sixth Method and the CUP Method

The main difference between the Sixth Method and the CUP method is the extent to which taxpayers are required to adjust the quoted price to make it comparable to the conditions of the related-party transaction. In the CUP method, adjustments must be made for the physical features and quality of the commodity, volumes traded, period of the arrangement, timing and terms of delivery, and other factors, such as transportation, insurance, forging exchange, and payment terms (see the discussion on *Colombia v Carbones el Tesoro S.A* in Box 10.2).

Box 10.2. *Colombia v Carbones el Tesoro S.A. (Glencore) 2021*

In Law 1819 of 2016, Colombia established the CUP method as the most appropriate method to apply the arm's principle to commodity transactions. The *Carbones* case involved the sale of thermal coal to related parties. The court noted that when using commodity price lists (in a recognized and transparent commodity market), relevant circumstances—such as the nature of the commodity, volume discounts, the timing of transactions, the terms of insurance, the terms of delivery, and currency, among others—must be considered. Moreover, the court found that applying the CUP method requires that

- Agreements and contracts that fix the terms of the above factors are contrasted with those of third parties in order to verify whether they are consistent with what would have been agreed upon in comparable circumstances.
- Functions, risks, and contractual terms are considered, in addition to the reference price for a commodity.
- Reasonable adjustments are made for differences in contractual terms, the level of the distribution chain, the geographic market, the date, the associated intangible property, exchange rate risks, and realistic buyer alternatives, among others.
- An analysis is carried out with respect to the price at which the related party resells the coal to the final customer.

The court also pointed out that the CUP method may not be the most appropriate method in cases where the conditions of the good are not sufficiently similar or where the functions and risks assumed by the parties cannot be adjusted to reflect comparable circumstances.



Some tax authorities face challenges verifying the adjustments required for the accurate implementation of the CUP method. Consequently, they prefer the Sixth Method, which typically requires limited or no comparability adjustments. Zambia's version of the Sixth Method only permits adjustments for poor or low quality or grade, for instance. While some countries choose to align the Sixth Method more closely to the CUP—to deal with the challenges highlighted below—the key difference between the two approaches remains the level of comparability required, with the Sixth Method generally intended to be a simpler way of pricing related-party mineral sales.

10.3 Opportunities and Challenges Related to the Sixth Method

The main advantage of the Sixth Method is that a quoted price can provide a clear and objective point of reference for determining the related-party sale price, thus preventing companies from engaging in underpricing—a key concern for many resource-rich developing countries (OECD, 2018b). It was underpricing that prompted Zambia to adopt the Sixth Method in 2008. The tax authority found that Mopani Copper Mines Plc was selling copper to its related party, Glencore International AG, for much less than it was selling to third parties. The Supreme Court agreed with the tax authority's assessment, and as a result, Mopani was required to pay a total of ZMW 240 million (USD 13 million) in taxes assessed for the 2006/2007, 2007/2008, and 2009/2010 tax years (African Tax Administration Forum [ATAF], 2020). Zambia adopted the Sixth Method in 2008, shortly after these transactions occurred.

The Sixth Method also has the potential to simplify tax administration with respect to mineral sales, freeing up valuable time and resources to focus on other transfer pricing issues. In the case of Zambia, the ZRA indicated that when a mining company enters its tax return online, the system automatically inputs the relevant quoted price for related-party sales and calculates the tax accordingly. This significantly reduces (but does not eliminate) the need for detailed transfer pricing analysis. The objective and verifiable nature of quoted prices can also help to limit disputes with taxpayers by providing a common frame of reference and greater certainty with respect to tax liability (ZRA, 2022). The Ecuadorian Internal Revenue Service (IRS) also cited improved compliance and tax certainty as key benefits of using quoted prices (IRS, Government of Ecuador, 2022). To summarize, the Sixth Method offers governments a practical way to increase revenue from the mining sector that requires relatively limited audit activity (United Nations, 2021b).

One challenge is that, depending on how the Sixth Method is applied, it could lead to prices being set that are not at arm's length. Investors may refuse to comply for this reason or because the Sixth Method is not a traditional transfer pricing method. The OECD and ATAF's endorsement of quoted prices for the application of the CUP method has addressed some of these concerns. What is more, investors have reported positive experiences with the Sixth Method. One mining company in Zambia called it a "pragmatic approach" that has made the ZRA's treatment of mining sales revenue more predictable. Likewise, government officials in Ecuador did not foresee any negative impacts on investment, provided that the use of quoted prices is transparent and predictable and investors are informed (IRS, Government of Ecuador, 2022). It is worth noting that mining investors are also typically less responsive to taxation because of the location-specific nature of the resource (International Monetary Fund, 2010).

However, where these concerns become more material is if the Sixth Method results in unresolved double taxation. Because the Sixth Method is not one of the traditional transfer pricing methods, it may not be recognized by the country of the related-party buyer of the commodity. If that is the case, the buyer may be unable to access double tax relief, increasing the overall cost of the investment and raising a potential legal challenge under Article 9 (Associated Enterprises) of the United Nations (2021a) and OECD Model Double Tax Conventions (OECD, 2021). Countries could mitigate this challenge by aligning the Sixth Method more closely to the arm's-length principle by allowing a range of comparability adjustments, for example. Alternatively, they could classify the Sixth Method as a domestic anti-abuse rule rather than a transfer pricing method, putting it outside the scope of the arm's-length principle and, importantly, Article 9 (as discussed in Section 10.4).

Finally, while the Sixth Method is simpler and more robust than other transfer pricing methods, it still leaves the taxpayer with the first-mover advantage in determining the sale price, albeit starting from a quoted price. This puts the burden of proof on the tax authority to disprove the taxpayer's price, which may be difficult due to a lack of access to information, particularly comparable data, and limited technical expertise. An alternative is for the tax authority, rather than the taxpayer, to set the price. This practice is called administrative or norm pricing and is explored later in the chapter.

The opportunities and challenges summarized below are general and will vary depending on how the Sixth Method is designed.

Table 10.1. General opportunities and challenges of the Sixth Method

Opportunities	Challenges
<p>Simplifies tax administration related to intercompany commodity trading.</p> <p>Reduces the risk of mining companies selling their minerals to related parties at below-market prices to reduce their taxable income in the host country.</p> <p>Increases tax certainty for investors and, in doing so, reduces the risk of disputes.</p>	<p>Restricting adjustments to indexed benchmark prices or limiting prices to a specific quotational period or date could lead to prices being set, which would not take place between independent parties at arm's length.</p> <p>May result in unresolved double taxation depending on how the method is applied and characterized (i.e., domestic anti-abuse rule or transfer pricing method).</p> <p>The tax authority has the burden of proof to disprove the price set by the taxpayer. This may be complicated by a lack of access to information and technical expertise.</p>

10.4 Different Legislative and Regulatory Approaches to the Sixth Method

There is no one version of the Sixth Method. Instead, there are numerous variations across different jurisdictions. This section briefly analyzes some of the main differences and their implications for revenue collection, investment, and implementation. In particular:

- The date of the quoted price to be used
- The condition that the sale be to an intermediary that lacks economic substance
- The range of comparability adjustments accepted
- The legal characterization of the Sixth Method.

10.4.1 Pricing Date

The Sixth Method usually specifies the date or period from which the quoted price should be taken. Many countries using the Sixth Method prefer the date of shipment, which can be observed, as opposed to the date of sale, which is easier for taxpayers to manipulate. For example, Ecuador, Paraguay, the Dominican Republic, and Zambia all require taxpayers to use the relevant quoted price on the date of shipment. Zambia and Peru go a step further to prevent taxpayers from gaming the system by requiring that they use the average quoted price in the month of shipment, during the four months prior, or four months after the date of shipment in the case of Peru.

The advantage of using the average price is that it removes any opportunity for taxpayers to pick the lowest price point within the month of loading. It also smooths the price, which should be better for governments and taxpayers, particularly in the case of index prices that lack liquidity and may be subject to sudden spikes or drops. Of course, a potential downside is that the average price may be lower than the price on the actual day of shipment. The new OECD guidance (OECD, 2022) supports tax authorities imputing a pricing date (e.g., the shipment date) in circumstances where there is no evidence of the actual date used by the parties.

Some countries have chosen to remain more flexible with respect to the date or time period. For example, following the release of the new OECD guidance, Peru has given taxpayers the option to use the date of execution of the sales agreement or the average price within the 30-day period immediately thereafter. Brazil also uses the date of sale. This is advantageous for the taxpayer, as it gives them the option of using the quoted price on the actual date of sale. However, it increases the risk that taxpayers will choose a date that gives them the most advantageous quoted price, requiring close monitoring by tax authorities.

A compromise might be to create a rebuttable presumption that the average quoted price in the month of shipment will be used unless the taxpayer can provide reliable evidence of the price date agreed between related parties (e.g., bill of lading) and the tax authority cannot determine a different date following transfer pricing analysis. Colombia uses this approach in its application of the CUP method. Taxpayers must register the sales agreement with the related party before the first delivery of the product. The sales agreement must contain, among other things, the date of the price to be used. If the agreement is not registered in time, and if the tax administration does not have other reliable evidence regarding the date of the agreed price, the date of shipment may be used.

10.4.2 Economic Substance of Foreign Intermediaries

Countries such as Argentina have adopted the Sixth Method to target transactions where a mine ships its goods to a different jurisdiction (and entity) than the related entity it invoices. Typically, the related party is a trading entity that takes title to the goods for a limited period. Considering this objective, Argentina and some other countries only apply the Sixth Method to sales to an intermediary that is not the effective recipient of the merchandise and does not have economic substance. Ecuador also limits the use of quoted prices to transactions with related parties in low- or no-tax jurisdictions and/or an intermediary that is not a resident of the export destination. The advantage of this approach is that it selectively targets high-risk related-party sales, particularly those involving marketing hubs, which are a potential tax avoidance in the mining sector. This makes it more of an anti-abuse rule than a transfer pricing method, which may alleviate potential double taxation issues elaborated below.

However, other countries, such as Zambia, Paraguay, and Guatemala, have chosen to apply the method to all exports (and imports) to related parties. This avoids the need to determine whether the related-party buyer has economic substance, which can be highly subjective, and, if the taxpayer refuses to cooperate, require significant information from a foreign jurisdiction. As one study of the Argentine approach noted, “companies have found ways ... to provide the intermediary with substance and avoid the application of the Sixth Method”—although this has not prevented the tax authority from settling transfer pricing disputes (Grondona, 2018). It also avoids the risk that taxpayers game the system by interposing a third party between two related parties. Of course, tax authorities must still determine whether the parties are related—which may be challenging for those with weak information-gathering powers—and penalties. The downside of applying the method to all related-party sales is that, depending on how the legislation is drafted, it is more likely to be viewed as a transfer pricing method, which could result in legal challenges.

Notwithstanding the difficulties of verifying economic substance, countries that make this a condition of the Sixth Method could reduce the administrative complexity by setting out clear eligibility criteria and evidentiary requirements. For instance, Ecuador’s regulations set out the following conditions (IRS, Government of Ecuador, 2022):

1. The taxpayer should have a real presence in the territory of residence; have a commercial establishment there where their businesses are managed; comply with the legal requirements of incorporation, corporate and tax registration, and presentation of financial statements and their assets; and ensure that risks and functions are consistent with the traded volumes of operations.
2. The sum of income from passive income and intermediation in the commercialization of goods from or to Ecuador does not exceed 50% of their total income.
3. The value of its international trade operations with related parties by direction, management, or control does not exceed 20% of the value of its international trade operations carried out in the corresponding fiscal year.

10.4.3 Comparability Adjustments

A comparability adjustment is an adjustment made to the conditions of transactions between third parties to eliminate the effects of material differences between them and the related-party transaction being examined. For mineral sales, this means that the economically relevant characteristics of the quoted price must be comparable to the actual sales price. To that end, the OECD TPGs require taxpayers and tax authorities to account for all the relevant comparability factors—for example, the physical features and quality of the mineral, volumes being traded, timing and terms of delivery, transportation, insurance, foreign exchange, and payment terms.

The more comparability adjustments a tax authority allows, the closer the Sixth Method will be to the application of the arm’s-length principle. However, considering the lack of access to taxpayer information and comparable data, some countries have chosen to limit allowable adjustments to those that they can more readily observe and verify. Zambia, for example, only allows adjustments to the quoted price on account of poor or low quality or grade. If the quoted price is for copper cathode, which contains 99.999% copper metal, but the product being sold is concentrate, which contains 30% copper metal, taxpayers can adjust the quoted price downward to reflect the percentage of metal contained in the concentrate (see Box 10.5 for an example). This approach is simpler to implement, although it is not without its challenges (Section 10.3), and can be justified by the fact that the price of a mineral is primarily a function of its physical features and quality. However, the outcome may not be fully aligned with the arm’s-length price.

10.4.4 Legal Characterization of the Sixth Method

As stated in Section 10.3, one of the challenges of the Sixth Method is that if double taxation arises because of its application, taxpayers may be prevented from accessing relief under bilateral tax treaties. The Associated Enterprises article, usually Article 9 of a treaty, is generally understood as enshrining the arm’s-length principle, which requires related-party transactions to be priced according to comparable transactions between unrelated parties. To the extent that the Sixth Method diverges from the arm’s-length principle—by limiting comparability adjustments, for example—it may not be recognized by the country of the related party purchasing the commodity, in which case, double tax relief may not be available.

There are various ways to increase the likelihood that the Sixth Method is accepted by treaty partners as a legitimate transfer pricing method under Article 9. Generally, they involve giving taxpayers the right to prove that the related-party sale price is arm’s length, thereby excluding the application of a quoted price—for example, by giving taxpayers



the right to prove that their intermediary has economic substance or permitting them to make appropriate and reasonable adjustments to publicly quoted prices on account of product and transaction differences. Lack of information, particularly comparable data, may make these approaches difficult for some tax authorities to implement. Some countries may choose to treat the Sixth Method as a domestic anti-abuse tax rule, not as a provision within the transfer pricing rules. This puts it outside the scope of Article 9. This approach is similar to the Base Erosion and Profit Shifting (BEPS) Action 4, which limits the deduction of interest and other financial expenses to a percentage of tax earnings before interest, tax, depreciation, and amortization (tax EBITDA) (OECD, 2015). BEPS Action 4 does not conform to the arm's-length principle. But because it is a domestic measure designed specifically to target excessive interest deductions—a major source of profit shifting—most countries consider that it does not contravene Article 9. BEPS Action 4 and the Sixth Method are not entirely analogous. The former is more of a safe harbour and is currently supported by widespread agreement. Notwithstanding, both approaches deviate from the arm's-length principle for the purpose of limiting tax avoidance. Countries would need to weigh the benefits of imposing the Sixth Method against the risk of double taxation. Alternatively, the United Nations and OECD could write the Sixth Method into the TPGs, giving it legal standing from a treaty perspective (Articles 7 and 9) and for dispute resolution purposes.

10.5 Lessons Learned from the Implementation of the Sixth Method

Tax authorities must carry out several steps when implementing the Sixth Method. These steps will vary depending on how the legislation is drafted and the mineral it is being applied to. The steps are briefly summarized in Box 10.3. The discussion that follows is based on Zambia's experience of implementing the Sixth Method, as shared by key government officials in interviews with the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) and ATAF.

Box 10.3. Key steps in applying the Sixth Method include

- a. Determining the relevant index
- b. Verifying the quality of mineral exports, including adjustments for quality differences
- c. Verifying any allowable deductions
- d. Determining the quotation period
- e. Determining whether intermediaries have economic substance.

Source: ZRA, 2022.

10.5.1 Determining the Value of Mineral Exports

Mineral prices are primarily a function of the value or quality of the mineral. Therefore, governments must be able to determine the value first, before they can verify the price. For example, index prices for iron ore are based on the material containing a certain percentage of iron. If the percentage is below or above or there are impurities, the price will need to be adjusted, minus any deductions for transport and insurance costs.

Many governments of resource-rich developing countries lack access to independent information on the quality of their mineral exports. They do not have the testing facilities, equipment, or technical expertise needed to verify the quality reported by companies, leaving them vulnerable to undervaluation and, as a consequence, underpricing, especially in the case of sales to related parties (OECD, 2018b). The ZRA highlighted the difficulty it has accessing independent information on the grade of copper leaving Zambia, as well as the lack of experts that can make an accurate determination of the value.

This implementation challenge is not unique to the Sixth Method, but it does underscore the importance of countries being able to independently determine the value of their mineral exports if it is going to deliver anticipated benefits with respect to revenue collection. Governments should have access to expertise and equipment to test the grade and quality of mineral exports. In this regard, Zambia has found it useful to have a dedicated mining audit unit containing specialist expertise within the tax authority (ZRA, 2022). There should also be strong coordination between the tax authority and the mining regulatory agency to ensure the consistent valuation of mineral sales for the calculation of royalties and income tax (to the extent that they employ different valuation approaches).

Box 10.4. Strengthening access to information on the quality and grade of Zambia's mineral exports.

The ZRA and the Ministry of Mines and Mineral Development have taken steps to improve the availability of information on the value of mineral exports in Zambia. The Mineral Output Statistical Evaluation System records all base/precious metal export assay results. It gives the ZRA access to real-time information it can use to crosscheck any adjustments taxpayers make to quoted prices. However, there is still a challenge that companies provide the assay results rather than drawing them from an independent source. Zambia is working to establish a mineral laboratory that will produce an independent analysis of the quality and grade of mineral exports.

Source: ZRA, 2022.

10.5.2 Lack of Benchmark Prices for Some Mineral Products

Having verified the grade or quality of the mineral, governments must next identify a quoted price to apply the Sixth Method. However, not all minerals have a quoted price or one that is sufficiently developed to be used as a basis for pricing commercial sales. For example, gemstones are sold via tenders on specialized markets based on confidential producers' price lists (e.g., the De Beers Price Book). Similarly, intermediate products, such as bauxite, are sold directly to alumina refineries with limited spot sales, and lithium carbonate (for use in batteries for electric vehicles) has yet to develop a quoted price. While price indexes are beginning to emerge for both bauxite and lithium, it may be some time before there are enough independent sales from which to derive reliable average prices. In general, the Sixth Method works best for minerals that are traded into terminals or stock markets and priced on an international index (see Table 10.2).

However, there are many minerals and metals that do have publicly quoted prices. Base and precious metals—for example, gold, silver, and copper—are all traded into terminal markets with publicly quoted prices (e.g., the LME and London Metals Bulletin). Bulk commodities, such as iron ore and manganese, also have daily quoted prices. Tax authorities could triage the mining sector: apply the Sixth Method to minerals with quoted prices, simplifying and safeguarding revenue collection from some mineral products, thus freeing up time and resources to ensure accurate pricing of more opaque and hard-to-value commodities. For example, Zambia only applies the Sixth Method to base and precious metals, not to other commodities it produces, such as gemstones.

Table 10.2. The application of the Sixth Method depends on the mineral product

	Applicable	Possibly applicable	Applicable in limited circumstances
Mineral type	Base/precious metals and metal concentrates E.g., copper, gold, lead, zinc, nickel, silver, platinum metal groups	Bulk commodities E.g., iron ore, coal, bauxite	Gemstones E.g., rough diamonds, other gemstones
Quality specifications	Standard, stringent, and inflexible	Multiple standards, flexible and subject to discounts and premiums for quality	Based on multiple quality attributes and/or on trends in fashion
Markets	Terminal commodity markets and over-the-counter sales	Medium to long-term off-take contracts with prices renegotiated at frequent intervals	Tenders on specialized markets in assortments or as individual stones
Prices	Daily quoted prices	Daily prices for selected grades	Producers' price lists and tender prices

Source: Adapted from Guy, 2017.

10.5.3 Determining the Price of Intermediate Products

The Sixth Method reduces the risk of underpricing by providing a transparent starting point—a publicly quoted price—as a basis for pricing related-party mineral sales. However, quoted prices are often for processed or refined mineral products, such as gold bars or copper cathode, whereas many developing countries export unrefined products, making it necessary to adjust the quoted price downwards. Many tax administrations lack the information and expertise to verify these adjustments, which often reduce the price substantially.

Zambia's main mineral exports are copper concentrate and copper anode. Neither product has a quoted price, although there is an emerging market for metal concentrates. According to the law in Zambia, taxpayers must adjust the quoted price for copper cathode to account for differences in quality and grade. There may also be processing costs incurred in transforming concentrate and anode into cathode. These costs are typically netted off



the sale price the buyer pays to the mine. However, in Zambia, the law does not allow these deductions for the purpose of calculating sales revenue. The ZRA highlighted several challenges it faces in verifying adjustments for quality:

- Verifying the payable metals contained. This includes:
 - Determining the percentage of copper metal contained in the concentrate or anode (see previous discussion about valuing mineral exports).
 - Verifying the “recovery rate.” This is the amount of copper metal the smelter can economically recover from the concentrate or anode and that the mine will be paid for. The same challenges apply to byproducts (e.g., gold, silver).
- Verifying penalties for impurities. Smelters and refineries charge penalties for undesirable elements above a certain level as agreed in the contract of sale. There is no independent source of information on penalties.
- Verifying transport and insurance costs. The terms of sale of the quoted product may differ from the actual sale. For example, if the quoted product is sold Cost Insurance and Freight and the actual product is sold Free on Board, the mine will be paid the quoted price net of transport and insurance. While there is public data on freight costs (e.g., Baltic Freight Index), countries may need to adjust this for different volumes/ contents and shipping routes.

Some countries allow further deductions for the cost of transforming intermediate products into semi-finished or finished products. For some products, there are benchmark data that tax authorities can use to verify (e.g., copper); however, this is not the case for all commodities (e.g., gold).

Tax authorities may face significant challenges in verifying adjustments to quoted prices in the case of intermediate products. However, they face these challenges regardless of the Sixth Method. At least quoted prices provide a transparent starting point and basis to challenge taxpayers. Countries could simplify the application of the Sixth Method to intermediate products by providing guidance to taxpayers on what adjustments are allowed and how they should be made. Continuing the example of copper, taxpayer guidance could prescribe a standard range for recovery rates and penalties, the source of benchmark data (if it exists) for determining processing and transport costs, and any formulas to adjust these costs. Such guidance would need to be set out in a regulation or equivalent legal instrument so that it could be updated from time to time to reflect changes in the industry.

A more prescriptive approach has pros and cons. It would make the Sixth Method easier to apply and reduce the risk that companies deliberately overstate deductions. But it might also mean that they lose out on additional revenue—for example, if the smelter can achieve better recoveries than the standard rate prescribed in the regulation. Even so, forgoing some revenue may be worthwhile, considering the administrative benefits of a simpler, more robust approach (Box 10.5 contains an example of the potential impact of different recovery rates on the price per tonne of copper concentrate). Alternatively, countries could give companies the option of negotiating a pricing formula via an Advance Pricing Agreement (Guy, 2017). This would require a lot of resources from the tax authority, but in the process, they would have the opportunity to learn more about the value chain of each company.

Box 10.5. Impact of different recovery rates on the price per tonne of copper concentrate

	Copper metal contained (%)	Recovery rate (%)	Payable amount	Price (USD/t) of copper cathode	Value (USD/t) of copper concentrate
Scenario 1	30	95	0.285	4,000	1,140
Scenario 2	30	96	0.288	4,000	1,152
Scenario 3	30	97	0.291	4,000	1,164
Scenario 5	35	98	0.343	4,000	1,372

Source: Readhead, 2018.

10.5.4 Verifying Discounts for Marketing

Some countries allow taxpayers to discount the quoted price for marketing services (e.g., Ecuador). In the mining sector, the term “marketing” often describes the process of negotiating, selling, and delivering minerals, as well as the functions that support those activities. It is common for mining companies to locate marketing, sales, and distribution functions to centralized operating models (“hubs”). Related-party marketing hubs may be based in low-tax jurisdictions. One important reason for this choice is to take advantage of tax-planning opportunities. Consequently, allowing taxpayers to discount quoted prices on account of marketing services provided by related parties raises the risk of transfer pricing abuse, which may be difficult to verify due to a lack of information. The ability to negotiate a different price is limited for many commodities, raising questions about the legitimacy of marketing fees in general.⁵⁷

Many countries have adopted the Sixth Method to avoid the difficulty of having to verify deductions from sales revenue for high-tax-risk services such as marketing, instead limiting adjustments to those more directly linked to the price of a mineral. These countries still allow marketing costs to be deducted from corporate income tax, but the calculation of sales revenue is kept simple by limiting discounts. Countries that choose to allow marketing discounts from the sale price (and even those that do not) should require taxpayers to provide third-party sales contracts. Zambia recently introduced this requirement (see Box 10.6). Argentina, Paraguay, and Uruguay also require the registration of contracts involving the export and/or import of commodities, detailing the agreed conditions in such transactions (Grondona, 2018). The OECD TPG emphasizes the importance of taxpayers providing third-party end-user contracts to aid tax authorities in examining transfer pricing practices (OECD, 2022). Countries could also issue guidance on other aspects of sales and purchase agreements. For example, Australia provides guidance on how marketing costs should be calculated for risk assessment. The remuneration of marketing activities may need to be analyzed using other transfer pricing methods (Australian Tax Office, 2017).

⁵⁷ For more on this topic, see the *World Bank sourcebook on transfer pricing in the mining sector*: <https://documents1.worldbank.org/curated/en/801771485941579048/pdf/112346-REVISED-Dated-Transfer-pricing-in-mining-with-a-focus-on-Africa-a-reference-guide-for-practitioners-Web.pdf>

Box 10.6. Zambia requires taxpayers to submit third-party sales contracts and invoices on request

“(15) Where the base or precious metal is sold by a resident or a non-resident person to a related or associated person who sells that base or precious metal to an unrelated person –

(a) the resident person or non-resident person shall provide to the Commissioner General on the Commissioner General’s request, all third-party sales agreements and all third-party sales invoices relating to that sale.”

The penalty for failure to comply with the request is ZMW 240,000,000.

Source: ZRA, 2019.

10.6 Alternative Approaches to Pricing Mineral Exports

10.6.1 Administrative Pricing

Administrative pricing—or norm pricing—is another approach to pricing commonly seen in the oil and gas sector. Under an administrative pricing regime, the government, rather than the taxpayer, determines the value of the oil. For example, in Norway, the Petroleum Price Board has been appointed to determine the administrative price, which is set retroactively four times a year. The Petroleum Price Board meets every quarter to set the daily “norm price” (their version of administrative pricing) for each oil-producing field for the previous quarter.

The main benefit of administrative pricing over to the Sixth Method is that the tax authority has the first-mover advantage in setting the price for tax purposes. If the taxpayer disagrees, the onus is on them to demonstrate that the government’s valuation is incorrect. The intention of norm pricing is to achieve a reasonable approximation of arm’s-length sales values.



The main challenge of administrative pricing is having the necessary information and expertise to set a credible price per oil field. These challenges may be even greater for mining, considering the diversity of mineral products.⁵⁸ Notwithstanding, arguably, the information and expertise that governments would require to determine an administrative price are also needed to verify the transfer price. Tax administrations and taxpayers might find it easier to determine a price in advance rather than undergo costly, time-consuming audits with the potential for disputes.

10.6.2 Safe Harbour Approach

Countries with limited administrative resources may be interested in a safe harbour approach, which can be based on the CUP method or the Sixth Method, depending on the number of adjustments allowed. Under a safe harbour regime, companies that apply prices in related-party transactions at or above the pricing method defined by the government do not attract scrutiny from the tax administrations. Companies that do not comply are required to justify their pricing method to the tax administration. This reverses the burden of proof from the tax administration to taxpayers.

Safe harbours are a common tool used by tax administrations around the world to protect low-risk transactions, reduce compliance costs, and save audit resources. The OECD TPG states that “transfer pricing compliance and administration is often complex, time consuming and costly. Properly designed safe harbour provisions, applied in appropriate circumstances, can help to relieve some of these burdens and provide taxpayers with greater certainty” (OECD, 2018a). They are recommended, in particular, to define maximum cost markup for intragroup services.

Publicly communicated safe harbours for commodity prices are not yet common, but tax administrations often use similar approaches in their audit risk-assessment processes to choose which taxpayers and transactions to audit. From this perspective, a safe harbour on commodity prices is not substantially different from the publication of taxpayer guidance on accepted transfer pricing methods by a tax administration. It provides transparency and added certainty to taxpayers when selling minerals to related parties.

⁵⁸ For a more detailed discussion of the potential application of administrative pricing to minerals see Readhead, A. (2018). *What mining can learn from oil: A study of special transfer pricing practices in the oil sector and their potential application to hard rock minerals*, <https://www.cgdev.org/publication/what-mining-can-learn-oil-study-special-transfer-pricing-practices-oil-sector>.

Safe harbours could be useful for countries with limited audit resources and large mineral sectors. For example, the Republic of Guinea adopted a safe harbour regime for bauxite prices in related-party transactions in July 2022 (International Monetary Fund, 2022). This was motivated by the repeated assessment that export prices of bauxite, the principal ingredient in aluminum and Guinea’s main export, were far below the international market price. Under this regime, called the “bauxite reference price,” companies are required to sell their bauxite at or above a reference price or demonstrate the correct arm’s-length price for the mineral. The reference price is calculated by a formula from international price indices and based on quality and transport adjustments, as recommended by the TPG.

The risk with this approach is that taxpayers get to choose either to apply the safe harbour price, which cannot be challenged by the tax authority even if it is different from the arm’s-length price, or be more aggressive by pricing outside the safe harbour and contending that it is arm’s length. Some countries may consider this a risk worth taking, considering the time and resources they potentially save by administering a safe harbour price. Alternatively, some countries may prefer the Sixth Method, which also offers simplicity (depending on adjustments) without the need to be tied in by a safe harbour price.

10.7 Conclusion

Applying the arm’s-length principle to related-party mineral sales is difficult, requiring tax authorities to verify complex adjustments for which they lack comparable data or industry expertise. To simplify the pricing of related-party mineral sales, governments should consider adopting the Sixth Method, reflecting the fact that quoted prices play a key role in the normal commercial pricing of many minerals. This approach should be accompanied by clear legislative guidance on which quoted prices are to be used and which adjustments would be allowable, if any.

While it may not work for all minerals, the Sixth Method can be used to triage the sector, freeing up time for tax officials to focus on minerals with more complex value chains. Depending on the information and expertise that tax authorities have available to them, they may vary the level of comparability adjustments allowed. In the case of intermediate products, it may be helpful to issue guidance to taxpayers on how the Sixth Method should be applied, including ranges for standard adjustments. Finally, countries should consider characterizing the Sixth Method as a domestic anti-abuse rule rather than a transfer pricing method to increase the likelihood that taxpayers can access relief for any double taxation they incur as a result.

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Chapter 11.

Carbon Border Adjustment Mechanisms and Carbon Prices: Taxing mining for the energy transition

William Davis, Natural Resource Governance Institute with support from IGF and ATAF

11.1 Introduction

The European Union (EU) is considering introducing a carbon border adjustment mechanism (CBAM).⁵⁹ This mechanism is a tax on imports from outside the bloc on the estimated carbon dioxide emitted in their production that is equal to the price that EU-made products already pay for such emissions under the bloc's Emissions Trading Scheme (ETS). Manufacturers that have already paid a carbon price on their goods can deduct this from what they would be required to pay to the EU. The production of mineral-based goods is responsible for a lot of carbon emissions, so the sector could be significantly affected by this scheme (and those being considered by other countries, including Canada, the United Kingdom, and the United States) in the future.⁶⁰

The CBAM risks making mineral-rich countries that export these products (or the raw materials on which they are based) to the EU worse off unless they introduce carbon prices equal to the EU's. In this context, we recommend that mineral-rich countries consider introducing carbon prices. In addition to the wider benefits that these prices carry, they would also reduce or eliminate payments to the EU under the CBAM. We also recommend

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⁶⁰ Activities that use mineral products, such as the combustion of coal, are estimated to account for 28% of emissions (Delevingne et al., 2020).

that mineral-rich low- and middle-income countries lobby the EU to complement the CBAM with measures to make up for any negative effects on low- and middle-income countries. In this policy paper, we explore

1. The details of the EU's proposed CBAM
2. The CBAM's potential impacts on mineral-rich, low- and middle-income countries
3. Whether and how mineral-rich countries could introduce their own carbon prices
4. What kind of support they can lobby the EU for.

11.2 The Challenge Posed by the EU's CBAM

11.2.1 The Reasoning Behind CBAMs

CBAMs are (or should be) designed to avoid "carbon leakage," which is where high-polluting industries shift to countries with lower carbon pricing. Carbon leakage can undermine efforts to discourage carbon emissions by putting a price on them.

Box 11.1. What is carbon pricing?

"Carbon pricing" refers to either

- A tax on emissions of carbon-based greenhouse gases (GHGs), which can either be levied on emissions themselves or on energy or fossil fuel use.
- Rules requiring companies that emit carbon-based GHGs to have a permit to do so. Where these permits are auctioned by the government or can be traded, this creates a price for the right to emit.

There are also subsidies that can introduce a positive financial incentive for carbon emissions and tradeable performance standards, but we do not cover those in this policy paper.

Source: Tatiana Falcao, personal communication, 2022.



In the early years of EU carbon pricing, there appeared to be little carbon leakage. But a review of recent evidence suggests that it is indeed taking place. And as carbon prices rise (which they are doing rapidly⁶¹), we can expect there to be further carbon leakage—unless there is action to stop it (L’Heudé et al., 2021). In response, the CBAM is intended to ensure that firms only shift abroad when the private benefits outweigh the costs to everyone else (i.e., the cost of cutting emissions elsewhere to make up for the additional emissions resulting from carbon leakage—this is the “marginal abatement cost”).⁶² For example, imagine that the EU produces steel at a lower cost to society (production cost + marginal abatement cost) than country A. The EU also applies a carbon price equal to the marginal abatement cost. If country A does not apply this tax, then consumers may prefer to import from the EU, even if, once the cost of cutting emissions elsewhere to make up for this is taken into account, it would be more efficient for them to buy from the EU.

One way to prevent this from happening would be a global carbon price so that the cost of carbon emissions is taken into account in purchasing decisions by firms and consumers worldwide (including for goods that are not traded internationally). Given that there is no agreement on such a price, the EU (and some other countries) are pursuing a different strategy: applying a carbon price to imports through the CBAM. That way, even though they cannot control the decisions of firms and consumers worldwide, they will at least stop those based in the EU from being incentivized to purchase goods from regions with no carbon prices. Also, producers that export to the EU will be encouraged to reduce their emissions in order to cut the amount that they pay under the CBAM.

The CBAM could therefore be an important tool—not just for EU members but for many countries—for reducing carbon emissions worldwide. The European Commission estimated that a more limited version of the CBAM (excluding hydrogen) would reduce annual “CO₂ emissions in the sectors it covers [excluding electricity] by 1 percent in the EU and 0.4 percent in the rest of the world” (European Commission, 2021b; Gupte, 2023; Pleeck et al., 2022). Including electricity, it could reduce emissions from the EU and its neighbours by up to 0.8%, depending on the design of the scheme (European Commission, 2021c). Another study looking at a CBAM covering all “energy-intensive industries” suggests that this would reduce annual global GHG emissions by 2040 by around 3% from the 2019 total (author’s analysis of Perdana and Vielle, 2022; Ritchie et al., n.d.).

⁶¹ They are expected to rise further as the EU plans to cut the number of emissions permits it grants to industry to 2030 to meet its emissions reduction goals (European Commission, n.d.-e).

⁶² We refer to the “marginal abatement cost”—i.e., the cost of cutting emissions by a certain amount—instead of the “social cost of carbon,” which is an estimate of the damage caused by a given level of carbon emissions. The “social cost of carbon” is very hard to estimate over the long term, and several countries prefer to focus on the cost of abating emissions so that they can meet an emissions target consistent with the need to limit global warming to 1.5°C above pre-industrial levels. Moreover, the CBAM is based on a “marginal abatement cost,” as charges under the CBAM are equal to emissions prices in the EU ETS, which, in theory, will equal the marginal abatement cost. This is because, if the marginal abatement cost were below the price, companies that can abate more cheaply would offer to sell their emissions permits, driving the price down; if the marginal abatement cost were higher than the price, companies with higher costs would want to buy more permits rather than abating more emissions, which would drive the price up.

But the CBAM also poses problems. In particular, where carbon border taxes are applied to the exports of low- and middle-income countries, it can worsen the global distribution of income. And it could even lead to worse environmental outcomes when applied to products that non-EU countries can produce with lower emissions than the EU by raising the cost of importing those products. We discuss this issue in more detail later in the chapter.

11.2.2 The European Union's Plans

Under the EU's plans for the CBAM, importers will have to pay a levy equal to what they would have paid under the EU's ETS if the goods had been produced in Europe. Manufacturers that have already paid a carbon price on their goods can deduct this from what they need to pay to the EU, and goods that are subject to the same carbon price as the EU will be exempt.

The scheme will be phased in gradually. Initially, when it starts in October 2023, it will only apply to imports of cement, iron,⁶³ steel, aluminum, fertilizers, electricity, and hydrogen. In addition, importers of these products to the EU will only have to report on "direct emissions" from the production process of these goods (this is expected to mean excluding those from electricity used in their production and emissions from earlier stages in the value chain) (European Commission, 2022; European Commission, n.d.-a Monkelbaan & Figures, 2022). The charges will apply starting in 2026. At the same time, the EU will phase out the "free allowances"⁶⁴ given to European industry, which are the current means to prevent carbon leakage (European Commission, 2022).

After a transition period (the length of which remains unclear), the EU will review the scheme and consider including other products covered by its ETS.⁶⁵ The EU will also start charging importers for emissions from covered goods, including both "direct emissions" (see above) and "indirect emissions," which are yet to be precisely defined but are expected to cover emissions from creating electricity/energy used in the production process. Charges will be equal to what the producers would have paid for the same level of emissions inside the EU under its ETS (European Commission, 2022; Monkelbaan & Figures, 2022). If the producer already paid a carbon price during the import of the related goods, this can be deducted from what is paid to the EU (European Commission, n.d.-b.).

⁶³ I.e., iron metal, not iron ore.

⁶⁴ I.e., permission to emit a certain amount without paying for emissions permits.

⁶⁵ The EU's ETS covers the following emissions/sectors: carbon dioxide (CO₂) from electricity and heat generation; energy-intensive industry sectors, including oil refineries, steel works, and production of iron, aluminum, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals; commercial aviation within the European Economic Area; nitrous oxide (N₂O) from the production of nitric, adipic, and glyoxylic acids and glyoxal; and perfluorocarbons (PFCs) from the production of aluminum (European Commission, n.d.-c).



11.2.3 Impacts on Mineral-Rich, Low- and Middle-Income Countries

The EU's CBAM Could Negatively Affect Mineral-Rich Countries

Aside from the impacts mentioned above, the CBAM is also likely to have other effects—in particular, it could make some low- and middle-income countries (including mineral-rich ones) worse off by reducing their exports to the EU.⁶⁶ Even though raw commodities are not included in the EU's current proposals for the CBAM, they could still be affected—for example, in situations where mining countries add value in-country and/or by discouraging the use of and services that depend on these resources and, in so doing, reducing demand for mining products themselves. The exact impact on mining in low- and middle-income countries is still unclear, and at the time of writing, we were unable to find assessments that consider the details of the plans agreed by the EU and measure the impact on countries' GDP or welfare. And details of what the scheme will look like are still unclear. However, the available evidence suggests a risk of negative impacts on a range of low- and middle-income countries, including mineral-rich ones.

For example, several low- and middle-income countries depend significantly on exports to the EU of products covered under the CBAM; for example, according to the European Commission, Mauritania, Senegal, and Sierra Leone each have sectors that are exposed to the EU CBAM and contribute at least 2%—and up to 18% (depending on prices)—of the countries' GDP (European Commission, 2021a). Although there are simulations on the potential impacts of the CBAM on trade, GDP, and economic welfare, since some of the details of the scheme remain unclear (e.g., what exactly are “indirect emissions” and what products will be covered once the initial transition period is finished), it is difficult to know what the impacts on the global economy (and on mineral-rich low- and middle-income countries) will be. However, based on a brief review of the literature,⁶⁷ even conservative scenarios (based on the European Commission's initial proposal that covered only “direct emissions” and was the same as the current agreed list, excluding hydrogen) suggest that there would be small but significant impacts on some mineral-rich developing countries. In particular, He et al. (2022) find that total annual economic welfare in 11 individual low- and middle-income countries (including several that are mineral-rich) would decrease by USD 9.7 billion.⁶⁸ He & Li (2022) find similar results when looking at China exclusively.

⁶⁶ The same thing may happen to their exports to non-EU countries that are processed there before being exported to the EU, since those countries further down the value chain will have to pay a CBAM levy; if this is passed on to customers in the EU, it may reduce overall demand for the processed products and raw materials from mineral-rich developing countries.

⁶⁷ We focus on recent studies using computable general equilibrium models. These may be more accurate than articles that simply look at the trade exposure of different countries and try to draw conclusions on that basis; this is especially true in cases where countries with high levels of exports to the EU may benefit from the CBAM if their exports to the bloc are less carbon-intensive than those of other countries that export the same products.

⁶⁸ The low- and middle-income countries for which He et al. (2022) show individual results are Brazil, China, Egypt, India, Kazakhstan, Mexico, Mozambique, Russia, South Africa, Turkey, and Ukraine.

Both He et al. (2022) and He and Li (2022) find that these impacts could be worse if more products (and/or emissions from either electricity used in production processes or from the use of produced products) are included in a future expansion of the CBAM. United Nations Conference on Trade and Development (2021) studies a scenario looking at a CBAM on a different set of products covered by the EU's emissions and finds that it could reduce economic welfare in developing countries by USD 10 billion. Perdana and Vielle (2022), who assume that the CBAM will cover all "energy-intensive industries," estimate that a CBAM could reduce economic welfare significantly in a range of developing countries/regions, with impacts ranging from a 0.7% decline (Asia, excluding India and China) to a 2.7% decline (Russia). Lim et al. (2021) look at impacts on trade rather than economic welfare and estimate that aluminum and steel exports for a range of low- and middle-income countries would fall by an average of 13%–17%.

In an "extreme case" (not currently being proposed by the EU) where the scheme covers all sectors and all emissions associated with the product, He et al. (2022) find that the same 11 low- and middle-income countries' annual economic welfare would decline by at least USD 106 billion, and the GDP of some of those countries could be hit significantly.⁶⁹

The CBAM Could Undermine International Climate Cooperation

Some low- and middle-income countries have already expressed their strong objection to the EU's CBAM proposals. In particular, because the EU's GHG emissions per capita are higher than those of low- and middle-income countries, they may find that the EU is being hypocritical and "punishing" them for their emissions while emitting more itself. Moreover, the UN Framework Convention on Climate Change (1992) allows countries to set their own nationally determined contributions to climate change, stating that countries have "common but differentiated responsibilities according to their respective capabilities," which is to say that richer countries were supposed to take more action first (Pauw et al., 2019). The CBAM, however, will "force" the EU's partners to take action potentially faster than they would have chosen to (Böhringer et al., 2022). Given the link to climate policy, this move may sow mistrust and bad feelings related to "climate colonialism" and/or hypocrisy, especially since the EU's GHG emissions per capita remained 50% higher than those of the Group of 77 (a grouping mostly composed of low- and middle-income countries) in 2018, the latest year for which data was available (author's analysis of Climate Watch, 2020). This dynamic could undermine international climate negotiations. Indeed,

⁶⁹ The highest realistic decline may be that of Kazakhstan, which would see its GDP decline by 1.8%. Though Mozambique has a higher projected decline (2.5%), this may be an artefact of the model. One of Mozambique's main covered product exports is aluminum. However, Mozambique uses hydroelectricity to power its aluminum smelter, which means that it has much lower emissions intensity than other aluminum producers, so a CBAM could, in theory, help Mozambique by making it more competitive vis-à-vis other high-emission producers (though potentially less competitive vis-à-vis EU-based producers). This fact may not be captured in the model because the model uses emissions intensities for the non-ferrous metals industry as a whole, not aluminum production in particular, and Mozambique produces other non-ferrous metals such as gold (He et al., 2022).



several low- and middle-income countries have already expressed strong objections to the EU's CBAM proposals (Bernasconi-Osterwalder & Cosbey, 2021). Developing countries account for over 60% of GHG emissions (37%–40% if one excludes China), according to the latest available data, so cooperation between developed and developing countries is crucial for efforts to tackle climate change (author's analysis of Climate Watch, n.d.).⁷⁰

How can we square the circle of reaping the climate (and efficiency) benefits of a CBAM while avoiding a worsening of the global income distribution in the short run and the risk of poisoning global cooperation on climate? One approach is for affected countries to introduce their own carbon pricing systems, which will reduce or eliminate their tax bill under the CBAM (if they apply to products covered under the CBAM and meet whatever eligibility requirements the EU puts in place). Another is to lobby the EU to combine the CBAM with other policies that make up for negative impacts on low- and middle-income countries' economies. We discuss these options in the next two sections.

11.3 Should Mineral-Rich Countries Introduce Carbon Pricing— and How?

11.3.1 Pros and Cons of Carbon Pricing

If mineral-rich countries adopt their own carbon prices, they may be able to capture some or all⁷¹ of the revenues that the EU would otherwise get from their exports under the CBAM.⁷² Moreover, introducing carbon pricing may be in low- and middle-income mining countries' own interests, regardless of the need to avoid the CBAM, as discussed below.

⁷⁰ This statistic applies to two different definitions of "developing countries": the "non-Annex I" countries (roughly, developing countries for the purposes of international climate accords) and the "Group of 77" developing economies. Emissions figures are based on GHG emissions, including land-use changes and forestry in 2018.

⁷¹ They can capture all of these revenues if their carbon prices are at least as high as the EU's and they pursue carbon pricing using a design that will be deductible under the CBAM. Currently, it remains unclear what types of carbon prices will be deductible.

⁷² If introducing carbon prices means that the country needs to cut taxes in other areas to continue to strike the right balance between attracting investment and mobilizing revenues, then the introduction of carbon taxes will not necessarily increase the overall tax take.

Carbon prices are mainly important because of their role in tackling climate change, which is an urgent priority for countries across the world. Indeed, according to the *Report of the High-Level Commission on Carbon Prices*, carbon prices are an essential part of the transition to greener energy (High-Level Commission on Carbon Prices, 2017).

Behavioural science shows that introducing carbon prices can put more pressure on others to take action, even in countries that are low emitters by themselves (Schein & Baynham-Herd, 2021). As noted in Section 11.2.1, carbon prices can also, in theory, increase overall prosperity if set at the right level (United Nations Committee of Experts on International Cooperation in Tax Matters, 2021). The mining sector as a whole could also benefit from the adoption of a global carbon tax, as this would increase the demand for energy transition metals (Cox et al., 2022). As outlined in Section 11.3.4 more generally, where carbon pricing is introduced, it is important to combine carbon prices with other policy measures to have a “managed” energy transition.

A drawback of carbon pricing is that governments may need to reduce other taxes to make sure that, at least in the short term, carbon taxes do not weigh too heavily on the economy. But carbon prices do not provide very reliable revenues, as companies can reduce their emissions over time, which will undercut revenues from carbon pricing. Section 11.3.4 offers some ideas for dealing with this.

One of the main difficulties in introducing carbon pricing can be the time and effort that it takes to introduce it, or whether it is politically feasible at all, given potential political resistance from the industries or individuals that will suffer as a result (Martinez-Alvarez et al., 2022). For example, it took around 9 years to introduce carbon pricing in South Africa (from the initial discussion paper to a carbon tax coming into effect) (Machingambi, 2021). A review of the literature by Klenert et al. (n.d.) shows that while the public in some countries supports a high carbon price, the level of support can vary greatly from one country to another. Countries will therefore need to weigh how much of a priority carbon pricing is compared to other policy initiatives and/or revenues that they might wish to prioritize. Carbon pricing that is focused on export-oriented industries may face less resistance from citizens if they do not impact living standards, especially if those industries would otherwise have to pay CBAM charges (in which case, companies are also less likely to be resistant).

For countries where it will be politically challenging to introduce carbon pricing, if they have the necessary finances and bureaucratic capacity, it may therefore work better to either prioritize regulations, industrial policies, and subsidies for clean energy to green the economy (though some low- and middle-income countries may lack the fiscal resources to provide effective subsidies) (Ross, 2022). A review of relevant literature shows that effective design of carbon taxes and policies on how to use revenues from carbon pricing (especially for environmental projects) can help to boost public support (Maestre-Andrés et al., 2019).

For countries that only plan to introduce carbon prices to capture tax revenues that would otherwise go to the EU, they could focus on carbon taxes limited to sectors covered by the CBAM and/or exports to the EU from those sectors (though it is uncertain if the



EU would still deduct payments of such taxes from what needs to be paid under the CBAM). However, for countries that have trade agreements with the EU and/or are World Trade Organization (WTO) members, this may break the rules of these agreements by discriminating against the EU. Section 11.4 proposes that the EU's trading partners could lobby the EU not to retaliate against them if they wish to take such measures.

11.3.2 Emissions Trading vs. Carbon Taxes

If they decide to pursue carbon pricing, countries will also face a choice between ETSs (i.e., where companies need to have permits to emit GHGs, the number of permits is limited, and they must trade these permits among them) and carbon taxes. There are also “implicit carbon prices” introduced through taxes or subsidies on investment, but we do not discuss those here.

The choice between emissions trading and carbon taxes will generally depend on a country's individual circumstances (Barragán-Beaud et al., 2018). In many cases, carbon taxes and emissions trading are combined, which may be the best choice for some countries (see, e.g., Cao et al., 2019). Stavins (2019) reviews the costs and benefits of carbon taxes compared to emissions trading and provides advice on which one will be more suitable under what circumstances.

However, for most developing countries, including mineral-rich ones, carbon taxes are usually a better choice than emissions trading because they are easier to administer than ETSs, and developing countries often lack the administrative capacities to make them work well (Partnership for Market Readiness, 2017). In fact, according to the United Nations, ETSs have only ever been successful in developed countries (United Nations Committee of Experts on International Cooperation in Tax Matters, 2021). In the mining or mineral processing sectors, it can be particularly difficult to apply ETSs based on intensity measures (Partnership for Market Readiness & International Carbon Action Partnership, 2016).

11.3.3 Design and Implementation

Given our recommendation that carbon taxes may be more appropriate for most developing countries than ETSs, our focus will shift exclusively to such taxes. There are a number of considerations for designing carbon taxes in developing countries, as well as significant existing literature—for example, the UN recently published the 200-page *Handbook on Carbon Taxation for Developing Countries* (UN Committee of Experts on International Cooperation in Tax Matters, 2021). We will not repeat that analysis here outside of recapping a few key points and seeing how they apply to the mining sector.

A key choice in designing carbon taxes is at what point in the value chain to levy them. For example, they can be levied on the purchase of fossil fuels (based on the emissions expected when those fuels are burned). This is easier to administer than trying to measure

and tax emissions, which carry the challenges of monitoring, verification, and reporting (Partnership for Market Readiness, 2017; United Nations Committee of Experts on International Cooperation in Tax Matters, 2021).

Taxes based on trying to measure the level of emissions (known as “downstream” taxes) can also have advantages in that they can cover a wider range of emissions (e.g., fugitive methane emissions, whose levels cannot be predicted from the level of fossil fuels used in production). “Downstream” taxes can be designed in a way that manages the administrative costs—for example, by focusing on large emitters, as in the case of Chile’s carbon tax (United Nations Committee of Experts on International Cooperation in Tax Matters, 2021).

In the mining sector, for all except coal mines, an “upstream” approach may be best. This is because the vast majority of emissions from most mines come from power consumption (author’s analysis based on Delevingne et al., 2020). For coal mining, most GHG emissions come from fugitive methane, so direct measurement of these emissions appears to be needed alongside an upstream approach for fossil fuels used for power (author’s analysis based on Delevingne et al., 2020). The United Nations Economic Commission for Europe (2021) offers guidance on how to monitor, report, and verify methane emissions from coal mines. The report (p. 23) suggests that continuous emissions monitoring may be needed to use the data for a carbon tax or ETSs and provides guidance on how to implement this approach.

It is important to allow time before entry into force to allow businesses to develop the procedures to assess how much tax will be paid and how to pass costs on to their customer. Businesses may also need time to undertake investments in greening their production procedures; without this, businesses that would be viable if they could undertake such investments may go bankrupt. For this reason, it may be advisable to signal that the government intends to adopt carbon pricing as early as possible and/or to use public investments to support companies in greening their production processes. Public consultation can also help to improve both the design of the tax (by receiving feedback from industry) and the level of compliance with it (see, e.g., South Africa’s experience with revising its carbon tax).

11.3.4 Accompanying Policies

Adjusting Other Parts of the Tax Regime

When introducing new taxes, it is always important to check whether the overall tax burden remains manageable and whether the fiscal regime is striking the right balance between revenue-raising and supporting the economy. This is no different with carbon taxes (or emissions trading, where permits are auctioned). These elements are particularly important



in the mining industry (and the rest of the extractives sector) because, in developing countries, high capital costs mean that they depend heavily on foreign investment (United Nations Economic Commission for Africa, 2019), and there may therefore be a higher risk of investors leaving due to increases in the overall tax burden. In fact, introducing a carbon price is likely to have strong impacts on the costs and competitiveness of a country's mining sector (Ulrich et al., 2022). Countries should therefore reassess the overall tax burden when introducing carbon prices/taxes and, if necessary, adjust other tax instruments (and/or moderate the level of the carbon price) to ensure that the right balance between attracting investment and maximizing revenues is struck.⁷³

In addition to the need to manage the overall tax burden, it is also important for mineral-rich countries to manage the balance between different tax types. Extractive-sector taxation generally requires a balance between (i) taxes that are more flexible and progressive (e.g., profit-based taxes) and that allow the government to capture a high share of rents without deterring investment in projects that are less profitable and (ii) taxes and royalties that are more dependable and easier to measure (since these can guarantee a minimum level of revenue and be less vulnerable to tax avoidance by extractive companies) (Natural Resource Governance Institute, 2014). Too much emphasis on type (i) taxes can risk revenues being disappointing. Too much emphasis on type (ii) taxes may deter investment in less profitable projects and make countries miss out on higher tax revenues when profits are very high—as in the case of Zambia's copper mining industry (Manley, 2017). One way to achieve a good balance between flexibility and dependability is to use variable-rate royalties, as covered in Chapter 9 by Anna Fleming, David Manley, and Thomas Lassourd in this handbook.

Although they have advantages from environmental and economic efficiency perspectives, as far as raising revenue goes, carbon taxes, unfortunately, combine some of the worst aspects of both of these tax types: they are not flexible (they do not respond to changing economic conditions), but they also are not fully dependable since companies can green their technologies and reduce their carbon emissions over time, which will undermine government revenues.

⁷³ Some minerals are important for the transition to green energy; ensuring an adequate level of supply to meet demand will help to tackle climate change. For these minerals, it is particularly important that taxes do not prevent investment.

To assess how a carbon tax affects the overall mining tax regime, it is important to model different approaches to mining sector taxation to understand the effects on revenues and investment; as of 2022, the IMF's latest version of its publicly available mining fiscal model includes the option to model carbon taxes. Modelling can also be useful to analyze other changes to the tax regime conducted in combination with a carbon tax, as well as whether these manage to maintain the right overall burden of taxation and the right balance between flexibility and dependable revenues.

Even if the tax regime achieves the right level of tax burden when the carbon tax is introduced, it may become too generous as mining companies green their operations and, in so doing, reduce the amount of carbon tax that they pay (they are indeed likely to “green” their operations). Once this happens, governments could be tempted to then change taxes to make up for lost revenues. But companies that have invested in greening their operations may experience lower profitability due to the cost of those investments, so increasing taxes could threaten their viability and deter investment. Moreover, frequent tax changes tend to discourage investment. It is better to have a tax regime that anticipates these changes from the start so that companies can predict their tax burden.

But how would this look in practice? When reassessing their tax regimes and what mines can afford to pay in tax before investment is deterred, governments might be tempted to assume that all mines are already using the greenest available technology (so that the tax burden does not become too light when mines adopt this technology, as described above). But, for existing mines that are not shielded from new environmental taxes by stabilization clauses, this could hit them too hard since they probably have invested in older, polluting technologies and will face a high carbon-tax bill (or a high bill for having to write off highly-emitting capital if they decide to green their operations) (Delevingne et al., 2020). This might send a message to investors that, even if investment is viable now, the government could always increase taxes later, making it unprofitable. To address this, governments could provide a reduction in other (non-carbon) taxes for existing mines compared to the regime that new mines (i.e., those where construction/digging has not yet started) will face.⁷⁴ In this way, they can set a tax regime that avoids being overly generous to new mines (by setting the appropriate tax burden, assuming that they invest in new, low-carbon technologies) while not taxing existing mines too heavily.

This approach of combining carbon prices with tax exemptions for existing mines could also allow governments to apply carbon prices to existing mines that have stabilization clauses in their mining contracts that allow individual taxes to change but state that the overall economic favourability must be maintained. In this case, the reduction in other taxes could

⁷⁴ Some might argue that they could offer reduced carbon tax rates to existing mines. But if they do this, they will blunt the incentive for existing mines to switch to greener technologies. Therefore, it may be better to reduce other taxes to make sure that the overall tax burden is manageable.



offset the effects of the carbon tax so that these mines are not worse off overall. However, governments should be careful not to be out-negotiated in discussions over changes to such stability clauses with mining companies.⁷⁵ Where stabilization clauses do not allow any negative adjustments, even if economic equilibrium is maintained, governments could nonetheless encourage the mine to green its operations by offering tax credits for the deployment of emission-reduction technologies. The mining company may agree to this offer, as it represents a “positive” change.

The approach outlined in the last paragraph addresses the difference between existing mines and new mines at the time when the carbon tax was introduced. However, it does not address the fact that low-carbon technologies could change over time in ways that governments cannot fully predict. Thankfully, there is a tried-and-tested approach to dealing with uncertainty over mine economics: using flexible tax instruments can increase the tax rate for mines that are highly profitable and decrease it for those that are only slightly profitable. These tax instruments include resource-rent taxes and variable-rate royalties. When introducing a carbon tax, therefore, it is important to ensure that the overall mining tax regime is sufficiently flexible so that if mines become very green and pay low carbon taxes or if the price of green technologies falls substantially, they will still pay a good level of total taxes.

Industrial Policies for Managing the Impacts of Carbon Pricing on the Mining Sector

To help companies and workers make the transition to a low-carbon economy, the High-Level Commission on Carbon Prices (2017) suggests combining carbon pricing with active industrial policies. These policies include public investment, subsidies for green investments, etc. The literature underlines the advantages of these industrial policies—if they are correctly designed (Naudé, 2010).

This approach could

- Mobilize investments by both the private and public sectors to green the economy faster.
- Help companies with the cost of adopting green technologies and, in so doing, speed up their adoption. If companies instead have to meet these costs themselves, it may slow down adoption where they have to borrow money to finance investments in green technologies.
- Help new green industries emerge by coordinating investments (it often helps productivity if multiple companies invest in similar industries at the same time, in the same place) and by helping to retrain workers that are laid off as a result of reductions in demand for highly polluting products or services.

⁷⁵ However, in cases where existing mines are not protected by stabilization clauses, it might not always be necessary to offset the burden of paying a carbon price by cutting other taxes. In such cases, countries should assess the new fiscal regime, including the carbon price, using financial modelling to see if the tax burden would be excessive.

How can governments do this? While we do not have space to survey the ample literature on industrial policies for greening the economy, a recent review of the literature (Ferraz et al., 2021) found that some green industrial policies that seem to be effective include subsidies for renewable energy, public investment in renewable power generation, support for skills necessary to expand renewable power generation and the uptake of green technologies, public awareness campaigns, efforts to create “green jobs” by incentivizing the use of labour over capital, the promotion of research into green technologies, etc., all linked by careful policy sequencing.

One particular concern for the mining sector is that many mines rely on fossil fuel-generated electricity. Introducing a carbon price could therefore be very expensive for such mines and threaten their commercial viability. In such cases, it may be important for governments to invest in (or, potentially, co-invest with) mining companies or otherwise support increased low-carbon electricity generation or provide reductions in other taxes so that the companies can viably invest in renewable energy technology. Some mines have already started to use renewable energy—for example, electric vehicles in Australia and Chile (Delevingne et al., 2020), and several mining companies have committed to running their mines solely from renewable energy (e.g., in Brazil and Chile) (Ramdoo, 2022). In some countries, laws can require companies to purchase energy from national monopoly suppliers that rely on fossil fuels (International Council on Mining and Metals, personal communication, January 31, 2023); it is therefore important to ensure that the law allows miners to produce their own, greener energy in such cases.

Mining countries will also need to be concerned about carbon leakage if they implement a carbon tax and will potentially need to introduce their own policies to counteract it. Encouraging international carbon pricing could be a good option—it would avoid international disputes that trade taxes and carbon border adjustments can generate while being more effective at cutting emissions (especially since it would cover non-traded sectors as well as traded ones). But it may be difficult to persuade all trading partners to pursue this approach. Therefore, countries could consider an alternative, like their own carbon border adjustment. This would help to prevent (i) a hit to countries’ economies from high-polluting input industries shifting elsewhere and (ii) carbon emissions increasing as high-polluting industries shift locations rather than cut emissions. A meta-analysis from Branger and Quirion (2014) suggests that carbon leakage does occur and that such border adjustments can reduce the extent. However, these adjustments may be complex and challenging to administer.

Another alternative would be to use tariffs on the import of high-carbon products or electricity, which would be easier to administer than a carbon border adjustment because there would be no need to assess the level of emissions from imported products; however, implementing tariffs might be difficult due to commitments under trade agreements. A further alternative could be to use consumption-based carbon taxation, which would apply to all products, regardless of whether they are imported or produced in-country, in proportion to the GHGs emitted during their manufacture. But consumption-based carbon taxes are complex to administer and, to date, only really exist in theory (United Nations Committee of Experts on International Cooperation in Tax Matters, 2021).



Managing Impacts on Incomes

It is also important to counteract the impacts of carbon prices (taxes or emissions trading) on the poor, as they could worsen poverty and/or income inequality (Malerba et al., 2021). For countries where high-emission products are used domestically for staple goods (e.g., where fossil fuels are a leading source of energy), carbon prices could hit the poor particularly hard. In such cases, the government may wish to pursue complementary policies, such as using revenues from the carbon tax to provide income support for the poor and/or pursuing the development of alternative (cheaper) energy sources. In countries where mining is a major source of employment and carbon taxes will lead to a reduction in mining output, it may be advisable for governments to provide retraining programs and income support and to invest in local economic development projects for affected regions.⁷⁶

Protests against carbon taxes and other policies that raise fuel prices (e.g., in France and Nigeria) and the lower popularity of carbon taxes among those whose incomes are hit the hardest (Arndt et al., 2022; Lepissier et al., 2022) show the potential political risks of failing to address the impacts of carbon taxation on ordinary people. But the public support for carbon taxation in other locations (e.g., British Columbia, Canada) that did take care of impacts on the cost of living shows that carbon taxation can be popular (Pretis, 2022).

11.4 How Should Mineral-Rich Developing Countries Lobby the EU Over the Proposed CBAM?

Mineral-rich low- and middle-income countries could lobby the EU to counteract potential negative impacts on developing countries. In particular, they could argue that the EU should counteract negative impacts on developing countries by providing increased financial and/or technical assistance to help them green their economies—especially the

⁷⁶ Some commentators argue that revenue from carbon pricing should be deposited in a worldwide future generations fund that could be invested in greening the global economy. Because pollution is a global externality with impacts over the long term (Goa Foundation, personal communication, January 13, 2023), such a fund could compensate those who suffer as a result of pollution. While this idea is interesting, it does not take into account that (i) if countries that are poorer than the global average pay into a fund for people across the world, this could worsen global inequality and (ii) in some contexts, the current generation may be better off than future generations (depending on policies pursued today), so such a fund could worsen intertemporal income inequality. In addition, it appears unnecessary for there to be such a fund if individual countries use their carbon pricing revenues in this way. We therefore recommend that countries that are richer than the global average could put carbon pricing revenues toward fighting climate change instead.

sectors covered by the CBAM.^{77, 78} Funds provided for this purpose should, of course, be in addition to existing climate finance and aid commitments rather than simply “recycling” money that was already committed. Given rich countries’ poor record of delivering climate finance pledges, the financial commitments could be included in the law establishing the CBAM and tied to estimated negative impacts on developing countries—such a legal commitment could help to ensure that the right amount of money actually gets delivered.

In addition to helping to tackle climate change, these investments will also potentially cut the cost of energy in recipient countries (as, following the initial investment, renewable energy can be relatively cheap) and make their exports more competitive, especially as more and more countries introduce similar border carbon adjustments (Canada, the United Kingdom, and the United States are all considering such adjustments). Greening sectors covered under the CBAM in developing countries would also potentially reduce the cost of living for European consumers (by making imports from countries receiving assistance cheaper). This result would reduce the EU’s need to use revenues raised from the CBAM to help European consumers deal with a higher cost of living (which is how the EU currently plans to use those revenues), producing a win–win for the EU. And as noted above, switching to greener metal processing could also be an opportunity to help developing countries leapfrog competitors that already have old, dirty plants installed.

However, risks remain that the EU would not provide adequate compensation for the CBAM’s impacts (or that, even if it did provide adequate compensation, this would reduce the amount of funds that it would provide to meet its other climate finance commitments). It may therefore be a good idea to revisit the design of the CBAM itself. It may be useful to consider three key objectives for the CBAM:

- Environmental protection (in this case, achieving the greatest cuts in emissions)
- Economic efficiency (cutting emissions at the lowest cost)
- Equity (in this case, ensuring that the better-off countries bear as much of the potential costs as possible).

It appears that the current design of the CBAM focuses on environmental protection (by preventing carbon leakage and incentivizing emissions cuts in producers exporting to the EU) and economic efficiency (by incentivizing customers to switch to buying from a producer when its cost of production, plus the cost of abating those emissions, is less than for other producers). But it does not take into account international equity, as it has no measures to avoid negative impacts on low- and middle-income countries.

⁷⁷ Delevingne et al. (2020) outline clear ways for the mining sector and downstream metal processing to cut emissions.

⁷⁸ We focus on low- and middle-income countries because there is a stronger case that the EU should avoid the negative impacts of the CBAM on them than on high-income countries. In particular, high-income countries have a greater responsibility to take climate action in line with the EU; if they are not doing so, this may indicate a lack of commitment to tackling climate change, and the “incentive” to green their industries provided by the CBAM may be more justified.



How could a revised design account for those countries' needs? Given the known devastating impacts of climate change, especially for low- and middle-income countries, there is no advantage for them in sacrificing environmental protection. But there could be a case for prioritizing equity over efficiency by tilting the scheme to advantage firms from low- and middle-income countries. This approach would also have the advantage of reducing negative impacts on climate diplomacy.

One such approach that would prioritize equity and environmental protection would be to offer particular low- and middle-income countries' industries exemptions from the CBAM, in cases where providing such exemptions would not worsen climate change. Low- and middle-income countries could lobby the EU to commission an independent assessment of its imports from developing countries under the CBAM; those imports where the CBAM would not help the environment (i.e., there is no carbon leakage and any reduction for demand in the products would not cut emissions) could be exempted from the CBAM.⁷⁹ One such example could be where developing country producers have lower emissions than if the same products are produced in the EU and where the total amount consumed is not price-sensitive. Exempting these producers from the CBAM could result in lower emissions (at least in the short run) because it would encourage European customers to purchase more of their goods from these lower-emission producers (in the long run, it could blunt the incentive for these producers to cut emissions). Or, where there are several developing country-based industries that produce products covered by the CBAM with lower emissions than European producers, the EU could levy CBAM charges only on emissions in excess of those of the greenest producer so that consumers are incentivized to prefer greener producers (balancing the cost of production with the cost associated with the emissions).

However, for those countries' industries where the CBAM *would* improve efficiency and reduce carbon emissions in the production process, exemptions are not ideal because the world would miss out on the reduced carbon emissions/increased economic efficiency due to carbon leakage as a result (though modestly).⁸⁰ It might be better to include these industries within the scope of the CBAM but provide "compensation" for negative impacts, as described above. Since the countries and industries where carbon leakage is occurring could change over time, especially as the EU carbon price rises (Pleech et al., 2022), the EU or an independent body could keep this under review and adjust if necessary. However, if the EU is not able to provide adequate measures to counteract such negative effects, then an exemption for those industries could also be considered.

⁷⁹ Some readers might be concerned that this would violate the principle of non-discrimination among countries at the WTO (as described in most-favoured nation clauses). But exceptions to most-favoured nation clauses are allowed if they can be justified on environmental grounds. If the CBAM was designed to only apply in cases where it would actually help the environment, then an exemption could be justified on environmental grounds (Pauwelyn & Kleimann, 2020). Such an exemption could be restricted to developing countries under the WTO's Enabling Clause, which allows non-reciprocal preferences by developed countries for developing ones (World Trade Organization, n.d.)

⁸⁰ E.g., Perdana and Vielle (2022) find that providing an exemption for least developed countries would increase carbon leakage, leading to higher global emissions by 0.1% of the 2019 total.

There are, of course, other options for the EU to offset the impacts of the CBAM, but most of them would be inferior to the one described here. For example, countries might also be considering lobbying the EU for trade concessions to make up for the negative impacts of the CBAM. The problem with this is that increasing trade with one trading partner may reduce it with another, and reducing trade barriers with certain countries can erode the value of low-trade barriers with others (by reducing their advantage in exporting to the EU market). In particular, least developed countries already benefit from duty-free, quota-free market access to the EU market, so if the EU lowers trade barriers or boosts trade with other countries (e.g., by making its concessions through the Generalized System of Preferences more generous), they may be left worse off.⁸¹ Another approach could be to cut subsidies to domestic EU industries, but this can be politically complicated, and such subsidies can sometimes have beneficial effects for other countries (to the extent that the EU subsidizes their consumption of its goods). Greater cooperation in other areas might also be possible, but such cooperation might occur anyway if it is win-win, so developing countries may still find themselves worse off as a result of the CBAM (and there may still be negative political effects on climate cooperation)—hence the preferred solution of providing support to “green” affected industries in developing countries.

11.5 Conclusion

The EU’s proposed CBAM could have a significant impact on some developing countries, including mineral-rich ones, depending on how the design evolves.⁸² To avoid this, these countries could lobby the EU to introduce measures to offset negative impacts. Supporting increased climate finance to help affected industries to go green appears to be a promising solution that could be a win-win for both the EU and the developing countries that export to it. Developing countries could also lobby the EU to provide exemptions for their producers that have lower emissions than EU producers of the same products.

It could also be in some developing countries’ interests to introduce their own carbon prices, with the dual purpose of avoiding their exports to the EU being subject to them and tackling climate change. Carbon taxes, rather than ETSs, seem to be more appropriate for use in most developing countries.

⁸¹ Least developed countries are provided with duty-free, quota-free access to the EU market under the Everything But Arms scheme, detailed here: <https://trade.ec.europa.eu/access-to-markets/en/content/everything-arms-eba>.

⁸² Further research that takes into account the latest details of the proposed design could be useful to quantify this impact.



Countries that do adopt carbon prices can manage negative side effects through active industrial policies to support industry and income support to individuals (and/or retraining for those who lose their jobs in sectors that re-size). In the mining sector, it is particularly important to review the tax system to ensure that it does not become uncompetitive and/or tip the balance too far in favour of non-profit-based tax instruments when a carbon tax is introduced. If this occurs, countries should consider adjusting other elements of the mining tax system. Countries should also consider supporting the development of green energy (e.g., through public investment) to help industry cut its emissions; this approach may be particularly important for the mining sector since it is often obliged to generate its own electricity separate from the grid.

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Chapter 12.

Securing a Fair Share for Communities Using a Development Turnover Tax

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12.1 Introduction

Some of the most critical fiscal instruments in the mining sector are those that target the specific needs of people in resource-rich countries. This policy paper is dedicated to contributions made to local development through development taxes on turnover or gross sales. Many countries require local community or infrastructure contributions by mining rightsholders, to the order of 0.5%–3% of turnover. These can be highly effective contributions and should be put in place by all resource-rich countries, using lessons and best practices from past projects on how to design them and ensure adequate monitoring.

The specific development turnover tax proposed by the author would compel private mining companies to invest in public shared infrastructure such as electrification, roads, sanitation, water supply, and communication technologies or certified public benefit activities such as education, health care, the environment, and welfare to uplift the local communities impacted by the allocation of mineral rights in a licence area. Such investments would take place at the local level and possibly at the regional or national levels if several companies and levels of government reached the required agreements. In the absence of such investments, the national revenue authority would collect a development turnover tax from taxpayers engaged in the extraction of mineral resources and hydrocarbons (hereafter referred to as mines or mining) that would be applied to a government-administered mining development fund with similar spending priorities.

12.2 What Is a Development Turnover Tax?

The development turnover tax would be a monthly self-assessed tax at a flat rate of 0.5%–3% of turnover. The development turnover tax is in addition to any existing environmental, social, and governance obligations imposed on mining companies. For ease of administration, the turnover would be calculated based on the average indexed commodity price of the resource extracted multiplied by the production volume per month. Mining companies would have the option to invest directly in public benefit activities and public shared infrastructure to receive an offset from the development turnover tax liability. Otherwise, the development turnover tax would be applied to a government-administered mining development fund established expressly for this purpose. The only allowable tax deduction in the determination of the development turnover tax would be the cost of certified public benefit activities undertaken in the month, with allowed carryforward of excess balances. The carryforward of excess balances should be unlimited to encourage sizable upfront investment by mines (at the time of the establishment of the mine) in public benefit activities that can be offset over the life of the mine.

The certified public benefit activities may include (but are not limited to) expenditure on education (e.g., building and equipping math and science schools, funding bursaries, and providing paid internships for indigenous employees), public shared infrastructure (e.g., extensions of fibre/5G and transport infrastructure), the environment (e.g., carbon sequestration, water treatment, and rehabilitation), health care (e.g., COVID 19 vaccines for the public, tuberculosis treatment, HIV treatment, malaria eradication, and building and equipping hospitals and clinics), and welfare (e.g., food gardens for impoverished communities, accommodation and care for the aged and people with disabilities, safe houses for abused women and children, and construction of sporting facilities and communal halls).

The relevant government authority would certify qualifying public benefit activities annually. The government would publish an official notice (gazette) of them in its medium-term budget as forming part of investment in shared public infrastructure that will support economic growth. The gazette should also determine whether there are public benefit activities that the government wants to incentivize further and that will qualify for additional allowance setoffs from the development turnover tax liability. The certification of public benefit activities that qualify for the additional allowance will be subject to review by the National Audit Office.

The government authority would monitor the implementation of the certified public benefit activities using a set form beneficiary sign-off of receipt of proceeds or state civil engineer attestation of completion of work and documentation supporting the proof of



expenditure. A qualifying beneficiary would be any recipient of the certified public benefit activities in local communities affected by the allocation of a mineral right in a licence area. In terms of public shared infrastructure projects, the qualifying beneficiary would be any local, regional, or national government entity where the project is signed off on by the state civil engineer.

The development turnover tax would apply to all mineral resource rightsholders. A mechanism could be introduced for rightsholders to apply for a partial abatement of or exemption from the development turnover tax with respect to marginal mines or artisanal and small-scale miners. The development turnover tax itself would be deductible for corporate tax purposes as an expense in the mining operations. The policy rationale for this approach is to align the tax treatment of the development turnover tax to the tax treatment of corporate social responsibility (CSR) expenditure by mines.

The development turnover tax can complement an existing corporate tax and royalty structure, where such taxes are collected centrally to fund budgeted spending by the government. The development turnover tax is distinguishable from royalties in that the tax is not applied to the fiscal budget process. Royalties paid to the central government can undermine the incentive for the government to provide services to local communities in exchange for the collection of personal taxes (Grzybowski, 2012, p. 17), which may leave those communities impacted by mining even more impoverished than before the mining development began.

The development turnover tax is distinguishable from corporate income tax as it is levied on turnover and not the taxable profits of the rightsholder. The development turnover tax is a deductible expense for the calculation of the corporate income tax base. It is closer in design to an alternative minimum tax, as the turnover development tax and alternative minimum tax are both calculated on a percentage of turnover. Profitability is not a determinant of levying the development turnover tax; its trigger is the production of mineral resources or hydrocarbons from the mine. The development turnover tax is regressive (like royalties) compared with corporate income tax, which is a more progressive tax. Governments should seek to achieve a balanced mix of both regressive and progressive taxes in the design of their fiscal regime (Wen, 2018).

The development turnover tax could be implemented in the short term through an amendment of the mining and/or tax law if no fiscal stability agreements are impeding the introduction of new taxes on mining projects. If there are fiscal stability agreements in place, the development turnover tax could be introduced with the issuing of new mineral rights and a transitional period negotiated with those existing mineral rightsholders who enjoy the protection of these agreements. It may furthermore be possible to negotiate immediate implementation with existing mineral rightsholders who might be keen to participate in the development turnover tax because of the social licence benefits, regardless of their fiscal stability.

The benefits for governments of a development turnover tax are that 1) policy-makers identify areas for advancement that satisfy a government's economic growth targets, technological aspirations, and political ideologies; 2) the use of average indexes to approximate commodity pricing helps avoid manipulation of the tax base; 3) monthly frequency promotes regular cash flow; and 4) the calculation, audit, and administration cost for the collecting agency is small.

The development turnover tax should not face strong resistance from mining companies because (i) it would be modest in its scope and represent a deductible expense for income tax purposes; (ii) it would encourage mineral rightsholders to invest for the benefit of the citizens in the host country, which is a key factor in gaining their social licence to operate; (iii) it would allow mineral rightsholders the flexibility to choose from the certified public benefit investments in a manner that is mutually beneficial to the community and the company's operations in the source country; and (iv) it directly contributes to attaining sustainable development goals such as quality education, clean water and sanitation, industry, innovation, and infrastructure. The overall benefit is that it helps to keep social peace in the affected communities.

12.3 Prior Experiences With Development Turnover Taxes

Requiring companies to participate in community development is a common practice. According to Dupuy (2014),

where community development exists, the provision is typically contained within a country's domestic laws relating to mining or, occasionally business activities more generally. Such laws include requirements for companies to contribute to the development of, or provide socio-economic benefits to, community members located on or near the license area. Such contributions may include revenue sharing or other monetary compensation, improvements to educational or health services, opportunities for training or other livelihood diversification, and construction or repair of infrastructure, among others. In some cases, there are legal requirements for sub-national transfers or national funds dedicated to community development. (p. 200)

The idea draws from the requirement for community development by mines together with other tax concepts in use globally, such as benefit-sharing arrangements or "Works for Taxes" schemes. Other similar fiscal instruments include alternative minimum taxes, although these are typically designed as anti-avoidance measures in the form of minimum corporate income taxes.



12.3.1 Development Turnover Tax vs Benefit-Sharing Agreements

Grzybowski (2012) cautions that where the benefits of mining developments are distributed in a manner that appears unfair compared to the distribution of the costs, risks, and responsibilities, then those who are disenfranchised or bearing risks and responsibilities without fair compensation are likely to oppose the development giving rise to potentially violent conflict (p. 7).

Inexperience, asymmetrical information, external influences, and capacity limitations all contribute to suboptimal agreements for communities. The proposed development turnover tax is different from benefit-sharing agreements in that the certified public benefit activities are gazetted while benefit-sharing agreements prioritize projects through local consultations, culminating in community development agreements (CDAs).

Some countries—such as Botswana (Wankhede, 2020, p. 22), the Democratic Republic of the Congo (Wankhede, 2020, p. 22), Ghana (Wankhede, 2020, p. 23), Kenya (Wankhede, 2020, p. 23), and Uganda (Wankhede, 2020, p. 29)—require that a portion of production in the form of royalties is paid to communities within the licence area. Such monetary compensation seldom ensures that the lives and livelihoods of people in affected communities can be properly restored (Loutit et al., 2016).

Loutit et al. (2016) express that

the more effective Community Development Agreements (CDAs) share benefits flowing from the resource development to promote broader long-term and ongoing economic and social participation in the mining activities. Such benefits include financial contributions, such as the royalty, and non-financial benefits, such as local employment opportunities and commitments to source goods and services from local providers. Compensation can still be effectively employed to acknowledge those mining impacts that cannot be adequately remedied. (p. 8)

Loutit et al. (2016) elaborate further that

one of the goals of benefit sharing is to strengthen a community's asset base by improving the community's physical, economic, and human capital. This includes efforts to avoid communities becoming overly dependent on income streams from the mining activities, which can leave them vulnerable if the mine fails, becomes less productive or reaches the end of life. This is another reason for designing CDAs to provide a combination of financial and non-financial benefits, thereby linking community wellbeing to the sustainability of the mining activities, while also providing transferable skills, such as business and management skills that equip the community to continue its economic growth after the mine closes. (p. 8)

Many countries require local community or infrastructure contributions by mining rightsholders, to the order of 0.5%–3% of turnover (Adebayo & Werker, 2021, p. 1). In Guinea, mining rightsholders must conclude a local development agreement with the local community and contribute between 0.5% (minerals) and 1% (precious metals) of their turnover to the local development fund (Dupuy, 2014, p. 208). The development turnover tax is comparable to benefit-sharing arrangements in its turnover (gross sales) base, its possible rate (%), and its desired outcomes in terms of the non-financial benefits to local communities. The development turnover tax could operate as an alternative or complement to existing benefit-sharing arrangements or CDAs. Certified public benefit activities and investment in public shared infrastructure may both satisfy the rightsholder's obligations imposed under the CDAs and qualify them for an offset from the development turnover tax liability.

For those countries where there is no legal obligation to compensate local communities for the use of land or other adverse impacts of extraction, there may still be an obligation for private companies to produce and implement a social and labour plan that yields non-financial benefits that will be enjoyed by local communities impacted by the mining activities in the licence area. This plan may include mandatory contributions to training or education funds. The development turnover tax solidifies these social licence commitments by rightsholders to fund development activities, either in cash contributions to the state-administered mining development fund or direct social responsibility expenditure by the rightsholders.

In some countries, the full amount of the development turnover tax is not allocated to the affected community. For example, on June 26, 2015, when Burkina Faso's National Transitional Council (Conseil National de Transition), acting as parliament, approved a new Mining Code, 20% of the amount was allocated to the region and 80% to the community directly affected, for the purpose of solidarity with the local development fund.

12.3.2 Development Turnover Tax vs Works for Taxes

In 2008, Peru introduced a fiscal innovation called Works for Taxes that allowed private companies (not only in the mining and extractive industries) to pay a portion of their corporate taxes in advance through the execution of public works projects. By accepting infrastructure projects instead of future taxes, national, regional, and local governments in Peru would forego the mobilization of public funds and reduce the burden on government budgets, as the private sector would assume the upfront costs and management of new infrastructure projects (Del Carpio Ponce, 2018, p. 1). According to Del Carpio Ponce (2018, p. 2), Works for Taxes was created to address local infrastructure gaps in Peru, as well as multiple obstacles to investment in public works, including

- A lack of technical criteria to properly identify and select public investment projects
- Low-quality pre-investment and investment studies that failed to match real costs and work schedules

- 
- Substantial cost and project overruns
 - Numerous disputes with construction companies at the judicial and arbitration levels.

Del Carpio Ponce (2018) advises that

the Works for Taxes mechanism can be applied to public investment in urban development, telecommunications, agriculture, water and sanitation, tourism, public safety, transport, education, health, fishing, sports, protection and social development, culture, environment, and rural electrification. (p. 1)

Peru's Private Investment Promotion Agency designates possible public investment projects, and the Ministry of Economy and Finance checks the quality and approves the issuance of certificates (for offset against corporate taxes) after the project has been completed (Del Carpio Ponce, 2018, p. 1). Del Carpio Ponce (2018, p. 4) asserts that "Peru's 'Works for Taxes' program has the potential to benefit other countries facing low governance standards, insufficient fixed capital investment, and significant infrastructure and services gaps."

The development turnover tax involves the private sector in a similar way to the Works for Taxes mechanism, making it potentially a better governance tool than government allocation to public benefit activities (Del Carpio Ponce, 2018, p. 5).

Unlike Peru's Works for Taxes program, the development turnover tax, as proposed, is an additional tax on mineral rightsholders and is not intended to replace corporate tax payments. However, it follows similar principles. First, it supports the notion that private companies are sometimes more capable than local governments in the timely and successful execution of public infrastructure projects. Second, it suggests that there should be a shared burden of public infrastructure development, as the rightsholders also benefit from such investments.

Del Carpio Ponce (2018) notes this criticism:

A downfall of the "Works for Taxes" mechanism is that it is not yet accessible to all public entities, and it does not cover operational costs, just investment costs (the exception is sanitation projects that allow the mechanism to be used for operational costs for one year). This affects the sustainability of completed public works. (p. 4)

To address this Works for Taxes pitfall, the proposed development turnover tax is intended to hold the mine responsible for continued upkeep and maintenance of the investment for the duration of the mineral right held. At the end of the life of the mine, ownership of the shared public infrastructure investments is relinquished to the government (African Mining Legislation Atlas [AMLA], 2022, p. 67).

Another criticism of the Works for Taxes mechanism is that the selection and location of projects may respond more to private rather than public interest. Most projects executed through Works for Taxes are located in the areas of influence of the private companies undertaking them, which are not always the areas most in need of development (Del Carpio Ponce, 2018, p. 5). To mitigate this concentration problem, the Works for Taxes projects are first prioritized by each public entity; better-quality planning allows for better prioritization of projects. The proposed development turnover tax envisages the gazetting of the qualifying certified activities as determined by the government in its medium-term budget framework and does not leave the selection of qualifying activities to the mine.

Del Carpio Ponce (2018) observes that

only the larger companies with an established social responsibility program have been able to afford to participate in the “Works for Taxes” program, which remains too costly for smaller firms. This is due primarily to transaction and management costs, as well as the high degree of liquidity needed to disburse large capital amounts to fund major public works projects. ... Furthermore, the private companies that currently use the mechanism are among the biggest tax contributors in Peru, which may also complicate access to liquidity by the government in a country with high tax evasion rates. (p. 5)

The proposed development turnover tax addresses the difference in the size of rightsholders by providing for two options: either direct contribution toward public benefit activities and investment in public shared infrastructure investments or payment to a government-administered mining development fund. This effectively allows all mines, irrespective of their size, to participate. The development turnover tax does not substitute the collection of corporate taxes or royalty taxes, as it is applied in addition to these existing fiscal tools.

12.3.3 Alternative Minimum Taxes on Turnover

In response to corporate tax evasion, many developing countries are moving toward minimum tax schemes, whereby private companies are taxed on either profits or turnover, depending on which has the greater tax liability. These can be grouped as alternative minimum income taxes (AMTs). Where a tax on turnover is applied to replace corporate tax, the quantum of the AMT is low—for example, in Equatorial Guinea, the AMT is based on 1% of the oil and gas company’s previous year’s turnover. The AMT is used when the operations of the company result in a taxable loss or when the minimum tax is more than 35% of the taxable profits. In Tanzania, when a branch or company has incurred perpetual tax losses for 3 consecutive years, the branch or company is required to pay AMT at a rate of 0.3% on turnover. In Pakistan, turnover taxes reduced evasion by up to 60%–70% of corporate income and increased revenue collection by 74% without reducing aggregate profits (Best et al., 2015, p. 1,311). Companies with higher turnover and minimal profits argue that the turnover tax of 1.5% in Pakistan is too high, preferring a lower turnover tax of 0.5% (Khan, 2020, p. 1).



Although the purpose of AMTs is different from the development turnover tax, they have similar design characteristics, and lessons learned from introducing AMTs are relevant. For instance, the rate of the development turnover tax must be considered in combination with the other elements of the fiscal regime and the profitability of individual mines. Accordingly, it is important to model the total impact of mining taxation on the mines in-country before considering the adoption of an additional tax and the possible rate of such a development turnover tax. The rate that is set for the development turnover tax needs to be realistic: minimum tax regimes based upon turnover typically vary in rate between 0.2% (Tunisia) and 3% (Bolivia, Guinea, and Madagascar), with an average tax rate of 1.2% (Aslam & Coelho, 2021, p. 9). Most governments, especially in Africa, are encouraging the development of the mining sector and have provided incentives to attract investors in the mining sector. The introduction of a development turnover tax without allowances and exemptions may erode these efforts. To ensure acceptance and compliance by private sector mining companies, the introduction of a development turnover tax should include extensive stakeholder consultation, or its implementation will fail. It is also important to negotiate with mining companies because of the stability regime provisions in the tax convention. The most persuasive argument to convince mining companies to accept this new tax, despite the stability regime, is that the social investments will contribute to keeping social peace in the community and ensuring a conducive environment for business.

The proposed development turnover tax does not aim to replace the corporate tax in the absence of profit—it is an additional tax to be levied upon mining rightsholders irrespective of their profitability; nonetheless, policy-makers should be conscious that the rate of a turnover tax should be “reasonable” from the perspective of the taxpayer to avoid opposition to its implementation.

12.4 Implementation

Revenue authorities or other responsible government agencies may have limited capacity to regulate the development turnover tax. The ease of the determination of the development turnover tax based upon production volume and indexed to the monthly average of the approximate commodity pricing of the mineral (or another simplified rule used to assess the base of the mineral royalty by the rightsholder) makes it easy to administer. However, there may be several challenges in implementing the development turnover tax.

12.4.1 Anti-Avoidance

To prevent avoidance, the setoff of public benefit expenditure from the development turnover tax should be denied where the criteria for a deduction—namely, certification, beneficiary/state civil engineer sign-off, and documentation supporting proof of expenditure—are absent or incomplete. Furthermore, non-compliance penalties in the form of a 100%–200% increase in the development turnover tax payable should be levied as a punitive measure with respect to material non-disclosures, fraud, or misstatement by the rightsholder (taxpayer). In this penalty range, 100% would apply to unintentional non-disclosure, increasing on the continuum for material misstatements to a maximum of 200% ascribed to fraud by the rightsholder.

12.4.2 Enclave Infrastructure

It is important to guard against providing development turnover tax offsets for “enclave infrastructure.” AMLA (2022) explains that

enclave infrastructure is infrastructure that is tailored to the mining project’s needs and interests only. Such an approach will not create sustainable benefits for local communities. A needs assessment and consultation with the surrounding affected persons and local State authorities should be undertaken to guard against “enclave infrastructure,” and to ensure that the infrastructure benefits local communities beyond the life of the mine. (p. 64)

The government’s gazetting of approved public benefit activities will mitigate enclave infrastructure.

Similarly to concerns about enclave infrastructure, AMLA (2022) highlights that “there may be occasions where infrastructure must be developed on a site-specific basis. Even in those circumstances, there should be opportunities for local communities to benefit from infrastructure developments” (p. 64). Therefore, to gain local communities’ approval for their mining activities (such as environmental approvals) and to improve their access to markets (through roads, rail, and port infrastructure), mines are likely to limit their choice of investments to benefit those citizens that are directly impacted by their mining operations. The use of a government-administered mining development fund (as the alternative to direct investment in public benefit activities) will allow the state to concentrate its efforts on the provision of public benefit activities beyond host communities for the benefit of citizens at large.

12.4.3 Stakeholder Engagement

There is a continuum of beneficiaries, including individuals, local communities, and local and regional governments, that will benefit from the public benefit activities. These beneficiaries may disagree with the mine on the activities to be undertaken, which may lead to local tensions and possibly conflict.



Some countries' domestic laws require that mining companies engage with particular communities (Loutit et al., 2016, p. 3) and artisanal and small-scale miners (where these are already present in the proximity of the licence area), particularly where such communities have a legally recognized interest in the land on which the mineral rights are sought or already rely upon the licence area for their livelihoods. Completing environmental and social impact assessments and human rights impact assessments may be a legally mandated requirement in the granting of mineral rights (Loutit et al., 2016, p. 2). In these circumstances, the engagement of local communities for their consent to the allocation of mineral rights for a licence area can extend beyond a recommended international best practice (voluntary engagement) for a CDA to a legislative obligation to enter into such an agreement with the local community. The mining company should, in principle, obtain the local community's free, prior, and informed consent (FPIC) (Loutit et al., 2016, p. 3). Loutit et al. (2016) describe what FPIC means:

FPIC obliges governments and, where relevant, companies to ensure that local communities agreeing to mine activities are informed of the mine's likely positive and negative impacts and are providing their consent free from any pressure or interference and prior to the commencement of the mining activities. Companies should ensure that they engage in meaningful consultation with local communities by affording them the information and resources necessary to effectively negotiate an agreement that meets their needs with the object of obtaining the community's consent. (p. 3)

The development turnover tax is prefaced upon government policy-makers looking at nationally, regionally, and locally identified social needs and political aspirations and then defining the priorities of what constitutes "qualifying" certified public benefit activities and shared public infrastructure that qualifies the rightsholder for a deduction from the development turnover tax; however, the influence of the community and their participation in the selection of public benefit activities cannot be ignored. The guidance offered by Loutit et al. (2016) from the Columbia Centre on Sustainable Investment suggests that a three-stage process be followed by companies in the extractive industries to broker a CDA with local communities:

1. The pre-negotiation stage involves the company and the community or communities laying the groundwork for negotiations. This may include precursor agreements such as a memorandum of understanding (MOU) or a negotiating framework, each of which sets out rules to govern the process for negotiating the CDA.
2. The research and consultation stage incorporates stakeholder mapping to determine who stands to be affected by the mining activities, as well as impact assessments. During this stage, capacity building, to ensure community agency and ownership of the process, and education about the proposed mining activity should be provided by the company or government to communities that stand to be affected.
3. The final stage is the actual negotiation process and endorsement of the final agreement. Once the agreement-making process has concluded, monitoring and implementing the agreement then becomes a key focus. (p. 2)

A weakness identified by CDAs is that they tend to contain clauses that still favour or may leave considerable discretion to the rightsholder. Loutit et al. (2016) proposes that

to secure the effective functioning of the CDA, leading practice agreements include governance arrangements for managing the ongoing relationship between the local community and the rightsholder. ... Partnerships with civil society organizations (CSOs) are particularly useful where the community cannot implement the agreement and hold the rightsholder to its end of the bargain. (p. 12)

12.4.4 Small and Medium-Scale Mining Companies

Small-scale mining companies may not be equipped to provide certified public benefits activities. As such, a threshold in terms of the development turnover tax may be introduced, compelling the smaller mines below the threshold to make their payment of the development turnover tax to the government-administered mining development fund. This will allow for the accumulation of lower-value monthly development turnover tax payments within the mining development fund to reach the economies of scale for large-scale investment by the state toward certified public benefit activities on an ongoing basis.

12.4.5 Requirement for a Functioning Mining Fund

It will be necessary for governments to establish a mining development fund if it is not already provided for in their mining laws. A mining development fund would be founded upon similar principles to a community development fund (CDF). AMLA (2022) explains that

a CDF is one of the vehicles available for implementing mining companies' community development obligations and projects. A number of jurisdictions on the African continent use various types of CDFs, including trusts, companies, third-party security arrangements, special accounts, and more. CDFs are funded by a portion of the proceeds from mining revenues or profits, proceeds from royalties, taxes, state funds (used where the State has a direct stake in mining operations); or an upfront payment may be made by the mining company into the CDF. (p. 74)

The mining development fund would be funded by the development turnover tax from smaller mines (below the turnover threshold) and the shortfall in direct investment by large mines. AMLA (2022) continues:

Responsibility for management of the CDF would depend on the type of vehicle chosen, but would often lie with a body that is close to the beneficiaries of the funds such as ministries and executive agencies dealing with local government, decentralization, and rural development. Some legislations require the government to be an active player in the oversight and management of the CDF. While it is important for governments to have an oversight role to ensure that the funds are being disbursed for their contemplated objectives, it is difficult for them to be involved in the day-to-day management of CDFs. (p. 75)



Management of the mining development fund should fall within the executive authority of the Minister of Mineral Resources and the responsibilities of the Department of Mineral Resources. The decision making on the use of the funds in the mining development fund could be organized through a social investment committee comprised of representatives from the Department of Mineral Resources; Department of Public Works; Department of Environmental Affairs; Department of Health, Social Services and Welfare; organized labour groups; traditional leaders, mining industry bodies/associations of mining rightsholders; local communities; local government; regional government; and civil society organizations. The administration of the Mining Development Fund would be carried out by the Ministry of Economy and Finance, which would make a direct allocation in the medium-term budget framework to initiatives determined by the social investment committee of the mining development fund.

To ensure transparency, an open tender process should be followed for all awards to third-party contractors and service providers for activities carried out under the ambit of the mining development fund. All members of the social investment committee should be subject to vetting by the state security agency and be required to make declarations of conflicts of interest and disclosures of gifts. Minutes of the social investment committee meetings should be made available for inspection by members of the public upon request. The financial accounts of the mining development fund should be subject to audit by the state auditor general and presented to parliament in the same manner as other state-owned enterprises/companies.

12.4.6 Local Content Policy

It may be tempting to introduce mandatory quantitative local content policies in relation to the gazetted public shared infrastructure investments with the aim of extracting additional benefits for local communities beyond tax and royalty revenues. However, Korinek & Ramdoo (2017, p. 4–5) advise that such local content policies are not the most efficient way to leverage natural resources for broader economic development. The authors argue that local content policies may introduce distortions in various sectors of the economy and generally have a negative impact on productivity. A government-mandated preference to use local inputs raises costs for the extractive industries. Instead, governments should focus on creating an open and supportive trading environment that can help increase productivity and foster technology transfer and innovative business practices. For example, the government can introduce supplier development programs that help create clusters of firms that service the mining sector and can increase both capacity and employment in local small and medium-sized enterprises.

12.5 The Politics of Reform: Introducing a development turnover tax

The success of mining requires a partnership of common interest between rightsholders and local communities. Citizens demand to see real value in the extraction of non-renewable resources in the form of social investment, job security, and economic growth. The introduction of new taxes on mining activities aimed at meeting the demand of citizens without early and ongoing consultation leads to investor uncertainty that can lead to possible divestment from the mining sector.

Introducing the development turnover tax at a regional, continental, or global level or applying it as a new practice in domestic law for the mining industry internationally could balance out the sector's negative reactions to the introduction of a new tax. For example, it could be introduced in regional mining codes like the West African Economic and Monetary Union or an equivalent legal directive at the level of the Southern African Development Community or East African Community, among others. It could also be promoted by responsible players in the mining industry to encourage others to follow their lead.

Finally, a development turnover tax does not have to be introduced as a tax. It could be introduced in the form of an environment, social, and governance (ESG) obligation, which might better represent its purpose for the host government, mining communities, and mining companies. AMLA (2022) recommends that

Environment, Social and Governance considerations should be elevated into positive legal obligations. The imposition of positive obligations on mining companies by African governments should be consistent with each country's development objectives. The recommendation to impose positive obligations on mining companies in regard to local development should not be viewed as advocating for mining companies to replace the State's role with respect to such obligations contemplated in domestic and/or international law. The State should continue to play an oversight role in the formation and implementation of a mining company's positive obligations. (p. 23)



12.6 Conclusion

Governments have a responsibility to fulfill the needs of their citizens in terms of educating their young and burgeoning population; safeguarding the environment for future generations; ensuring accessibility to free, quality health care; and seeing to the welfare of impoverished and vulnerable citizens, such as the elderly, people with disabilities, women, and youth. It is also essential to economic growth that governments invest in public shared infrastructure and new technologies. The proposed development turnover tax can address these needs but should not be seen as a basis for the outsourcing of government responsibilities to mining companies. Governments remain accountable for the identification and effective monitoring of the public benefit activities and investments into shared infrastructure earmarked in its medium-term budget framework. The success of the proposed development turnover tax is dependent upon the following critical considerations:

1. The proposal is in addition to the existing legal, contractual framework for the allocation of mining rights (contractual, concession, or hybrid) and, as such, the introduction of the development turnover tax should be seen holistically as part of the broader government take. A “reasonable” rate for the tax should fall between 0.3% and 3% and will only marginally affect company profitability, so as not to dissuade investment. However, it can still help ensure that local communities benefit from the mining activities in their proximity. Governments can implement exemptions from the tax for loss-making mines and artisanal and small-scale mining. Additional offset allowances can be introduced so as not to diminish any existing tax incentives aimed at attracting productive investment.
2. The proposal is intended to function harmoniously with existing social licence requirements, such as formal ESG or informal CSR and CDAs (possibly tied to royalty allocations to local communities). The investment in gazetted public shared infrastructure and public benefit activities, accordingly, should qualify for recognition toward the fulfillment of these (ESG, CSR, or CDA) undertakings.
3. The proposed development turnover tax should not introduce a new level of approvals to be sought from communities or abrogate community engagement by governments and the approval process of national or regional governments in the allocation of the licence to mine. Nonetheless, larger mining companies are advised to engage communities in consultations about where they might make direct investments toward the gazetted public benefit activities. The same approach that is applied to successful CDAs is proposed for such community engagements.

4. Investor uncertainty can be avoided by early and ongoing consultations with the mining sector regarding the proposed introduction of a development turnover tax. Governments should give assurances that fiscal stability agreements in place will be honoured while still encouraging voluntary adoption based on the positive social compact that the development turnover tax encourages.
5. Finally, the development turnover tax may provide a pragmatic transitional solution to the difficulties identified by government investment in public works (reminiscent of Peru's Works for Taxes). When governments achieve improved project investment, management, and transparency in the application of tax spending, the need for the development turnover tax may become obsolete.

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Chapter 13.

Competitive Bidding: Can competition for mining rights increase government revenues?

IGF and ATAF, with contributions from Thomas Pogge (Yale University) and the ministries of mines in Colombia, Brazil, and India.

13.1 Introduction

Competitive bidding, under the right conditions, can result in an efficient way to assign public licences to private companies to extract subsoil resources. It has proven beneficial—and lucrative—for many oil-rich countries. Noting that the two sectors are different, this policy paper explores how competitive bidding can be used effectively by mineral-rich countries to increase government revenue.

A competitive bidding process is meant to use competition and transparency to select the most efficient investors—technically and financially—to develop a given mineral resource, or at least to sieve out unqualified investors. A government agency provides information about the mineral deposit to potential investors, who compete for the right to develop the resource. The investor with the best offer, or bid, is considered best suited to develop the resource and is allocated the corresponding mineral licence. This method is also known as the auction system or licensing rounds.

For known mineral resources, the bidding process is, in theory, superior to the “first come, first served” method, which is more common in the mining sector. In the first come, first served approach, a mining licence is awarded to the first qualified investor who expresses interest in developing the resource. Whereas this method is simple to administer, and the only viable one for exploration licences over unknown resources, the probability that the first investor is the most qualified to develop a large-scale mine is low. It can also be arbitrary and prone to corruption in the absence of strong transparency and oversight mechanisms.

The popularity of competitive bidding in the petroleum sector compared to mining can be attributed to the geological differences between the two sectors. Geological surveys typically say very little about the economic potential of a mineral resource when compared to seismic surveys carried out in the oil sector (Haddow, 2014). As such, oil companies are more willing to make an investment decision based on this preliminary data as opposed to mining companies. Governments will need to provide a more detailed data package for competitive bidding in the mining sector to take place.

Many mining countries have included the provision to use competitive bidding in their legislation, but few have conducted licensing rounds. There is also a renewed interest in competitive bidding in the mining sector as part of reforms to increase investment. Uganda and Saudi Arabia are the latest countries to introduce an auction system (El Yaakoubi, 2022; Uganda Gazette, 2021). As described in this Handbook, there is increased global demand for minerals to power the energy transition. Governments in resource-rich countries may wish to leverage this demand by using competitive bidding to allocate their mineral resources to qualified investors who will better maximize government revenue.

Licensing is an important risk area in mining sector governance (Natural Resource Governance Institute, 2021). A lack of transparency and oversight in the process can undermine the benefits accruing to mineral-rich countries. This policy paper describes the necessary conditions for countries to successfully implement competitive bidding to allocate mining licences and increase their revenue from the sector.

13.2 How Does Competitive Bidding Work?

An auction process builds on the concept of a competitive market to set the price of a transaction. In a competitive licence allocation, the government wants to “sell” a mining licence to prospective investors. The government provides equal information about the licence and the geological and geophysical data of the mineral deposit to all interested parties. Investors then use the information and their own technical know-how to establish the value of the resource and submit an offer, or bid, to develop the resource. The investor who bids the highest above the government’s minimum established criteria is given an exclusive mining right to develop the resource.



The bidding parameters established by the government can be based on

- Investment commitments (capital expenditure)
- Work program (time and volumes of production)
- Local content
- Fiscal terms (e.g., royalty rate or percentages of profit share)
- Signature bonus
- A mixture of the above.

An auction process is based on game theory (Bratvold, 2015). Bids can reveal to the seller how much value potential buyers attach to the mineral deposit. Each bidder has an incentive to submit the best offer based on available geological information, their own experience, as well as an assumption about how much other bidders are willing to bid. Their intention is to submit an offer that will outbid their competitors but at the same time provide a return on their investment. If their bid is too conservative, they risk losing the mining rights to another bidder. If they bid too high, they may not be able to deliver on their commitments and risk losing the licence or incurring financial losses.

13.2.1 Different Designs of Competitive Bidding

There are many ways to design an auction. Game theory predicts different outcomes depending on the auction design. Governments can choose from them depending on the type of licence they are offering, the level of interest from prospective buyers, and their own capacity to manage a complex licensing round. The most common are the following:

Sealed bids

In a sealed bidding process, bidders submit closed bids only once in a licensing round (Tordo et al., 2010). The bidder who bids the highest wins the auction. If the winner pays the highest bid, it is known as a first-price sealed bid. If the winner is made to pay the price of the second-highest bid, it is known as a second-price sealed bid. A second-price sealed bid prevents the winner from paying the highest bid they quoted. The assumption is that the highest bid may be overly optimistic and that the highest bidder only used it to outbid competitors—as such, it is further away from the true value of the resource (Tordo et al., 2010).

Using sealed bids reduces the risk of investors colluding to distort the auction outcome because each company does not know the bids submitted by other bidders until the winning bid is announced (Crampton, 2010). This design also increases the chance of the government getting higher revenues as bidders are inclined to submit high bid prices to increase their chances of winning the auction (Crampton, 2010).

Ascending bids

In ascending bids—familiar to the general public from estate sales and popular culture—bidders openly submit multiple bids one after the other, trying to outbid each other until there remains one bidder who bids the highest (Tordo et al., 2010). Bidders adjust their bid offers subject to the bids quoted by other bidders. This design is prone to collusion, as bidders can plan during the auction to fix the winning bid (Crampton, 2010).

13.2.2 Stages of Competitive Bidding

The typical cycle of a competitive bidding process includes the following elements (Columbia Center on Sustainable Investment, 2019; Stanley & Mikhaylova, 2011; Tordo et al., 2010).

- **Prequalification:** The government invites potential bidders to submit Expressions of Interest to bid for a mining licence. The objective of prequalification is for the government to gather interest from potential bidders and evaluate their track record and technical and financial capacity to develop the resource. It can help to triage credible investors and ensure there will be sufficient bidders for a licensing round. The government invites potential bidders to submit documents such as audited financial statements and their mining portfolios. In Colombia, once a potential bidder is prequalified, they are permitted to participate in several bidding rounds offered by the ministry (Juan Rodriguez, personal communication, 2022). Prequalification is not carried out by all jurisdictions.
- **Designing the bid:** The government prepares the bid package and chooses the bidding process and bidding criteria. It compiles the geological and geophysical data to be shared with potential investors. The bid can be designed by a government agency or an independent party contracted to do this on behalf of the government. The government can also set up a bidding committee with representatives from different institutions to oversee the bid.
- **Advertising the bid:** The government shares the bid package with potential investors. In the case where a prequalification process was conducted, the bid package would be sent only to prequalified investors. Normally, a government representative would launch the licensing round at a public event attended by many potential investors and transmitted online or on live television. Thereafter, a government agency may conduct international roadshows to advertise the bid.

The bid package can be accessed online on a government website, and physical copies are made available at government offices. A virtual-electronic data room is created where prospective bidders may view data available on the mining area and buy it. There may be a period within which the government can respond to questions from investors on the bid package.

- **Conducting the bid:** This step is done by either a government agency or a third party. Bidding itself can occur electronically or in person. If done electronically, potential bidders are given a timeline to submit their bids online. Once the given amount of time has elapsed, the government will evaluate the bids. If bidding is done in person, the government will set a date and time for all potential bidders to meet and conduct the bid. Several bids can be auctioned together or sequentially. Sequential bidding can be time consuming and costly for governments.

Bidding can result in a tie between two or more investors. In this case, the government may proceed to negotiate directly with each bidder to break the tie. If bidders bid below the minimum criteria, the government may annul the bid. The established minimum criteria may or may not be disclosed to potential bidders before or after the process.

- **Awarding of the mining licence:** The winning bid is awarded the mining licence. Other bidders are notified of the results; results should also be accessible to the public. In some jurisdictions, the award of a mining licence must be approved by parliament.

13.3 The Benefits of Competitive Bidding

Governments use competitive bidding to achieve different objectives, including increasing transparency in the licence-allocation process. The key objective, however, is to increase overall government revenue from a mining project.

Saudi Arabia and Nigeria introduced competitive bidding as part of a strategy to diversify their economies, which are dependent on the hydrocarbon sector, and increase investment in the mining sector (El Yaakoubi, 2022; World Bank, 2013). India introduced competitive bidding to increase transparency (Dr. Veena Kumari, personal communication, 2022). Brazil uses it for both large-scale and artisanal or small-scale mining. For the latter, the objective is to reduce illegal mining (Dione Macedo, personal communication, 2023). Guinea used it twice in the last 10 years to allocate bauxite and iron ore licences that had been previously explored and returned to the state.

Government can use different bidding parameters to achieve different objectives. Bids based on fiscal instruments are geared toward maximizing state revenues while those based on the percentage of local content aim to increase backward linkages in the mining sector. If the government is keen to increase forward linkages, they can design the bid parameters based on the investors' commitment to value addition (United Nations Economic Commission for Africa, 2011). It is important to note that these objectives can be achieved through other instruments and not necessarily using competitive bidding.

Box 13.1. Use of competitive bidding to fast-track production and encourage value addition

The Government of India has added some incentives that relate to the use of competitive bidding to achieve different objectives. According to the coal tender document,

“A 50% rebate on the final offer will be provided for quantity of coal produced earlier than scheduled date of production.”

This incentivizes the investor who is awarded the mining licence using competitive bidding to fast-track production. Additionally,

“A 50% rebate on the final offer will be provided for quantity of coal consumed or sold or both for coal gasification and coal liquefaction.”

This promotes the domestic use of the coal mined as opposed to it being exported.

Source: Government of India, 2022.

Successful competitive bidding can result in the following benefits for resource-rich countries.

It can bridge information asymmetry

Bidding gives governments access to additional information that various potential investors have on the commercial viability of a mineral resource, based on their experience and interpretation of the geological data provided. In competitive bidding, investors have an incentive to disclose their best offer to develop the resource. This gives the state information about the value of its resource that it did not have before. This bridges the information asymmetry that is typical of direct bilateral negotiations where the potential investor has more information about the resource and its development plans and can use it to their advantage to obtain concessions and fiscal incentives from the government.

It can increase investment

As an open process with international visibility, competitive bidding can increase investors' interest in a mining jurisdiction. Egypt's first licensing round increased the number of gold investors from one (Centamin) to 11 mining companies (Mining Technology, 2020).

It can increase government revenues

Competitive bidding can increase government revenue in three ways:

- i) Monies paid by all bidders (cost of bidding), such as bidding fees
- ii) The financial components of a bid, such as a signature bonus
- iii) The increased profitability of a mine from the selection of an investor who can optimize the deposit based on their financial and technical capacity as well as track record and as such increase the overall revenue potential of the project.

Box 13.2. The impact of auctions on revenues in Afghanistan and India

Example A: Afghanistan's Aynak copper deposit was put up for international auction in 2007. The bid translated into a one-off cash payment of USD 808 million and higher mining royalty rates (Stanley & Mikhaylova, 2011).

Example B: The Government of India receives an additional revenue stream referred to as an auction premium because of the design of its competitive bidding process. This is in addition to royalties and other fiscal payments, such as corporate income tax. The auction premium is calculated as a percentage of the value of minerals sold in a month, as quoted by the highest bidder during the auction. From 36 of its auctioned blocks, the government has received USD 2.6 billion in auction premiums. This is comparable to the USD 2.7 billion in mineral royalties collected from 405 of its working mines (auctioned and non-auctioned mines) as shown in Table 13.1 (Dr. Veena Kumari, personal communication, 2022). Thus the auction premium provides substantial revenue for India.

Table 13.1. The impact of auctions on revenues in India

State	Total number of working mines	Out of (a), number of auctioned working mines	Total royalty ⁸³ collection from all the working mines (USD million)	Total auction premium from the auctioned mines (USD million)
	(a)	(b)	(c)	(d)
Odisha	140	23	2,576	2,407
Karnataka	131	11	81	235
Andhra Pradesh	134	2	1	1
Total	405	36	2,658	2,643

It can reduce the risk of corruption

Competitive bidding is premised on the use of transparency to allocate mining licences. As long as bidding is conducted in an open and transparent process, the bid package and results can be accessed by the public, and there are strong oversight mechanisms, competitive bidding can limit discretion, collusion, and corruption.

It can discourage concession sitting

The prequalification stage of competitive bidding can weed out investors who have no technical and financial capacity to develop the resource. This prevents concession sitting, where unqualified investors take up licences for speculative reasons only to later sell them at a premium without having done any development. Other measures to minimize the risk of concession sitting include imposing minimum work programs, raising yearly surface fees, and relinquishment of the mining area, also available under other licence-allocation methods.

⁸³ While royalty and auction premium have different objectives, Table 13.1 gives a context for the magnitude of the auction premium.



13.4 Risks Associated With Competitive Bidding

Competitive bidding is susceptible to risks, which may result in a less efficient outcome or an altogether failed bid. These risks are described below.

Collusion

Bidders can conspire to fix the winning bid. The risk is higher in ascending bids where bidders know each other's bids or where a bidder can be coerced to withdraw their bid to allow another company to win. Also, bidders can use intermediaries and shell companies to hide their connection to one another and create the illusion of competition (Organisation for Economic Co-operation and Development, 2016).

One way to mitigate collusion is to require prospective investors to submit information on beneficial ownership to ascertain any relationship between the bidders. Another is to consider using closed bids where the bidders do not know the other bids submitted, thus reducing the risk of coercion. Governments may also establish penalties, such as banning bidders that have taken part in collusion from participating in subsequent licensing rounds. Alternatively, governments can prohibit a bidder from submitting the same bid as its affiliate (as in the case of India). If they do, both bids should be rejected (Government of India, 2022).

Corruption

Corruption in competitive bidding can occur when the licensing round is supplemented by direct negotiations. Direct negotiations bring with them risks of corruption through bribery and fraud if the process is not transparent and individual government officials hold discretionary powers.

Corruption can still occur in the absence of direct negotiations when a government official with privileged information, such as a member of the bidding committee, secretly grants confidential information to one of the bidders to help them to win the auction (Organisation for Economic Co-operation and Development, 2016). Corruption includes conflicts of interest, such as when a government official has an ownership stake in a company that is participating in the bid (Sayne et al., 2017).

Low participation from junior companies

Auctions can lock out junior companies that may have the financial and technical capacity to develop the resource but may be outbid by large companies.

Some countries allow for joint bidding, where bidders can work together to develop the resource. Others do not, for fear of collusion or reduced competition in the licensing round. Some countries, such as Angola, require investors to indicate their preferred level of participating interest and whether they want to participate as the operator of a joint venture. Depending on the response, the government may require investors to partner—also known as “forced marriage”—to develop the resource (Tordo et al., 2010).

Low competition

When the auction fails to attract competition between bidders, it may result in a less efficient outcome. There is no specific recommendation on the number of bidders required. India, for example, requires the participation of a minimum of three qualified bidders in its first round of ascending auction. If the bid fails to attract at least three bidders, they can re-auction the same block under the same conditions. If fewer than three bids are received on the second attempt, the auction can proceed (Dr. Veena Kumari, personal communication, 2022).

Investors might not take part in a bidding round if the auction is not properly advertised and only a handful of companies know about it. The timing of the auction might also limit participation, for example, when there is a downward trend in the price forecast for the mineral being auctioned and financing conditions are difficult.

Investors may be reluctant to participate in a bidding round if a country has a high risk of asset expropriation (Crampton, 2010). Investors will avoid making huge upfront payments associated with bidding, such as bonus payments, if the risk of not recovering those costs is high. Political instability and poor governance also hinder prospective investors from participating in competitive licence-allocation processes.



13.5 Conditions for the Success of Competitive Bidding in the Mining Sector

Given the above discussions, a successful competitive bidding process will depend on the elements described below.

Sufficient competition

The first requirement for competitive bidding is competition. The auction system relies on competition to identify the most efficient investor(s) to develop the resource (Crampton, 2010). The auction should therefore attract more than one bidder for competition to take place. The number of bidders will depend mostly on the quality and quantity of the mineral resource, judged according to the geological information.

Investors will also consider the market projections for the mineral. For example, high demand for critical minerals to fuel the energy transition would be followed by an increase in the price forecasts for these minerals. Investors will place high bids for such resources with the confidence that they will recoup their investments (Crampton, 2010).

Available geological information

Investors assess the quality of a resource primarily using the geological information provided as part of the bid package. Governments should therefore consider sharing as much relevant geological information as possible. Limited geological information will discourage potential investors from participating in the bid. Those that do participate may incorrectly value the licence and, as such, make uninformed decisions; investors with mining licences adjacent to the licence being auctioned will have an added advantage in determining the value of the licence.

Brownfield investments have more geological and geophysical data than greenfield investments, making them easier to auction than unexplored areas. Countries such as Colombia only auction mining blocks where the Colombian Geological Survey has collected sufficient data (Juan Rodriguez, personal communication, 2022). Governments should consider investing in collecting more data on unexplored areas in the mining cadastre and prequalifying investors to gather interest before conducting a bid.

Governments may still auction greenfield investments with a view to increasing the level of exploration activity and reducing the levels of uncertainty. In this case, the government should use parameters such as royalty and profit share, which are only payable once there is production or profit and as such reduce the costs to the investor (Cameron & Stanley, 2017). Government should avoid using instruments such as signature bonuses, as they are payable whether or not there is production or profit.

Information to be shared can be extracted from geological reports and mining plans or be data furnished by the previous licensee after relinquishment.

Box 13.3. Information India shares with potential bidders

- Location of the block, e.g., latitude, longitude, villages around, district, state
- Connectivity with the block, e.g., road, airport, rail
- Area, e.g., block area (sq. km), forest area, non-forest area
- Climate and topography, e.g., average annual rainfall, temperature (max/min), rivers
- Exploration, e.g., status (where it has been explored in detail), no. of boreholes, borehole density, faults
- Quantity of minerals, e.g., total geological resources
- Mineralized zones
- Hydrography, e.g., local surface drainage pattern
- Climate, e.g., average rainfall and temperatures
- Topography, e.g., morphology of the area

Source: Government of India, n.d.

One key concern with auctioning greenfield investment is what happens to a winning bidder who has conducted exploration and wants to relinquish the licence either because they do not want to proceed with exploitation or because they have determined that there is no sufficient deposit. Should they receive a refund in exchange for data they collect?

The expectation is that when an investor bids for an exploration licence, they fully understand the risk involved, i.e., that they may not find sufficient resources to proceed to the exploitation phase. Because of competing priorities, a government may not have funds to refund such an investor. It is necessary for the government to be clear on this aspect and consider incorporating it in the competitive bidding legislation, as in the case of India, below.



From the Standard Tender Document for Auction of Coal/Lignite Mines for Sale of Coal/Lignite: “Upon withdrawal of Vesting/Allocation Order, for any reason whatsoever including relinquishment, the expenses incurred by the Successful Bidder toward prospecting/exploration operations and preparation of Geological Report shall not be reimbursed” (Ministry of Coal, 2022).

Terms of the bid

If the government sets the minimum bidding criteria too high, few companies will participate in the bid. If the bid proceeds and the winning bid is overly optimistic, it can create inefficiencies, also known as the “winner’s curse.” The highest bidder may not meet the project milestones and, as a result, be required to pay penalties or force the government to renegotiate the terms. Governments should set a realistic reserve price and potentially consider using second-price sealed bids in cases where the first price seems unrealistic. Government may also consider not disclosing the reserve price or the “floor price” in case it deters companies from bidding.

Additionally, auctions with multiple bidding criteria may be complex to administer, posing a risk that auctioning countries may—due to a lack of expertise—make poor choices about bidding parameters or scoring and ranking competing bids. Any weakness can be exploited by investors that are able to hire experts and lobbyists to support their bids. Governments should limit the number of bidding parameters or hire independent firms to conduct bids on their behalf if they do not have the capacity to operate complex licensing rounds.

Transparency

Transparency in competitive bidding is critical. Without it, political interference and corruption can undermine its objectives. Governments should ensure that all information on the bidding criteria, bid evaluations, and bid results are made public. The process should also limit the use of direct negotiations. Governments should prohibit officials holding interests in mining companies from participating in bidding committees, as doing so would result in a conflict of interest (Westenberg & Sayne, 2018).

Capacity

Governments may lack the capacity to conduct complex bidding rounds. In this case, they may hire an independent auction expert to plan and carry out the bid on their behalf. For example, Afghanistan procured a third-party contractor to prepare its first international tender (Anyak) in 2004 since it had limited capacity. The third-party contractor worked closely with an interministerial committee (Stanley & Mikhaylova, 2011).

To minimize the time and financial resources spent in hiring auction experts, resource-rich countries could come together and create an international auction house for natural resource licence allocations. Any member country could then ask the auction house to manage its competitive bidding rounds. The auction house could be created under the United Nations system or housed by an international organization and dedicated to serving resource-rich countries' collective interests, much like conventional auction houses (such as Sotheby's or Christie's) operate in the long-term collective interests of sellers. It would be able to work with countries to auction mineral deposits in line with consensual forecasts of global mineral demand and, as such, would both optimize resource-rich countries' licence-allocation outcomes and help stabilize long-term supply and demand in the global minerals sector.

Box 13.4. The benefits of an international auction house

An international auction house would have three crucial advantages. First, due to economies of scale, it could afford to hire top experts that would match any expertise that even large investors could assemble. This would help neutralize any competence deficit on the government's side.

Second, it would organize successful auctions that are well publicized months or years in advance to ensure that all potential bidders are well informed of upcoming opportunities. This would maximize investor interest and increase competition for licences. It could also help countries plan in advance and coordinate their bidding rounds in the interest of avoiding excessive volatility and prolonged slumps in mineral prices.

Finally, an international auction house could also greatly promote transparency, ensuring that citizens of resource-rich countries know what licences have been awarded, to whom, on what terms, and according to which criteria. A high level of transparency would also reduce corruption. Countries would remain free to make deals outside the auction house, but the decision to do so would raise legitimate questions, especially if the country's officials then accept terms that seem unfavourable compared to those achieved by other countries or if they fail to disclose the terms of their deals altogether.



With or without external support, countries should consider having a bidding committee made up of technical experts (geologists, geochemists, geophysicists, and engineers), legal experts, and economists to design and run a licensing round or learn from the experts. The technical experts drawn from the mining ministry would oversee the collecting and packaging of the data as well as evaluate the technical bids. The legal experts would be responsible for drafting the tender documents and evaluating responses to the tender documents. Lastly, the economists would design and evaluate the financial bids. The legal experts and economists can be drawn from the treasury department, revenue authorities, and other relevant ministries.

13.6 Conclusion

Demand for critical minerals to fuel the energy transition presents an opportunity for governments to increase investment in their mining sectors. Under the right conditions, replacing the first come, first served and administrative methods of licensing allocation with competitive bidding could lead to a more efficient and transparent system. The success of the auction system depends on the geological information available on the resource, which is used as a basis for potential investors to compete for the right to develop the resource.

For the auction system to deliver increased investment in the sector, governments will need to carefully design the system. The minimum bidding criteria should not be so prohibitive that it locks investors out of participating in the bid. The system should provide little room for direct and closed negotiations, or else it will be prone to corruption. Compared to the first come, first served approach, the auction system is more complex to administer and will require governments to increase their capacity or turn to independent experts and auction houses for support.

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Chapter 14.

Improving the Monitoring of Quarry Production With Remote Monitoring Technologies

Africa Centre for Energy Policy (ACEP)
with support from IGF and ATAF

14.1 Introduction

In most resource-rich countries, regulatory oversight and revenue mobilization efforts in the mining sector focus on precious minerals at the expense of industrial minerals such as quarry aggregates. This limited monitoring makes it difficult for tax revenue authorities to independently verify production outputs and sales as reported by quarrying companies, possibly reducing government revenues from the sector.

This policy paper proposes using remote monitoring technology to afford tax authorities in Ghana and other developing and middle-income countries the ability to remotely monitor the production volumes and sales of quarry aggregates by quarrying companies. The technology holds the potential to empower governments to increase revenue collection from the quarrying sector by improving the efficiency of tax and mineral regulatory authorities in monitoring the production and sales volumes of quarry companies. Implementation of the technology may require some legislative changes, including requiring mining companies to use the technology to report their production volumes and sales. This policy paper further proposes some options for financing the required investment in the technology that aim to minimize the impact on government budgets and company finances.

Quarry aggregates, such as sand, gravel, and crushed stones, are industrial minerals that constitute an essential component of the modern, concrete-based built environment. They form part of the basic materials for constructing roads, housing, and rail infrastructure. The rising demand for housing and investment in infrastructure further contributes to the demand and consumption of quarry aggregates in Africa (Boakye et al., 2021). In addition, quarry aggregates are more locally traded and less exposed to global commodity market dynamics. Thus, the quarry industry is essential to smooth revenue shortfalls from precious minerals.

Prior analysis of the quarry industry by the Africa Centre for Energy Policy (ACEP) indicates that the revenue mobilization potential of the sector is hampered by inadequate regulation and monitoring (Boakye et al., 2021). Ghana's monitoring in the mining sector primarily focuses on precious minerals such as gold, neglecting other essential industrial minerals. Furthermore, ACEP's observations from field visits to quarry sites in Ghana did not show any evidence of the Ghana Revenue Authority (GRA), the authorized tax revenue mobilization institution, being present. The analysis also shows the significant revenue potential of the quarry sector, which was estimated to be about 18 times more than actual receipts by the government. ACEP's interaction with officials from the GRA revealed that inadequate records on quarries compound the difficulties in determining tax and royalty obligations by quarrying companies (see Box 14.1 for a summary of ACEP's initial study of the revenue potential of the quarry sector).

The revenue potential of the quarry industry calls for a robust and cost-effective mechanism that monitors the operations of quarries in Ghana. ACEP's study recommended using technology to enhance regulatory agencies' monitoring potential. These technologies include real-time video surveillance tools that capture export volumes from the production sites and enterprise resource systems that coordinate information sharing among local authorities and government regulatory agencies.

The Government of Ghana realizes the importance of the quarry sector and the need to leverage digital technologies to mobilize revenue. In April 2022, the Ministry of Finance indicated its readiness to partner with the private sector to introduce digital systems to monitor quarrying and other industrial mining activities to enhance revenue mobilization (Ministry of Finance, 2022). This commitment was part of the measures taken to restore the economy, given global economic challenges. The Government of Ghana's decision to consider using technology for revenue mobilization in the quarry industry suggests that ACEP's ideas for deploying such technologies could be adopted in other countries.

This study provides a detailed description of the technologies that can be used for monitoring quarry production volumes in real time for large-scale mines. It covers the technical components, functions of the technology, and investments required for its implementation. ACEP believes that this study could provide a valuable blueprint for the Government of Ghana and, more broadly, for other economies that aspire to leverage technology to maximize their potential to mobilize revenue from the extractive sector. In addition, many countries' current pursuit of digitization provides a favourable environment for deploying digital technologies. Therefore, this idea lends itself to ongoing digitization schemes and related efforts by governments.

Box 14.1. A summary of ACEP's initial study on the revenue potential of the quarry industry

ACEP selected a sample of quarries across the main aggregate-producing regions of Ghana. To independently verify the production volumes of quarry aggregates from quarrying companies, truckloads of quarry aggregates directly sourced from the sampled quarries were used as proxies for production.

Estimation assumptions

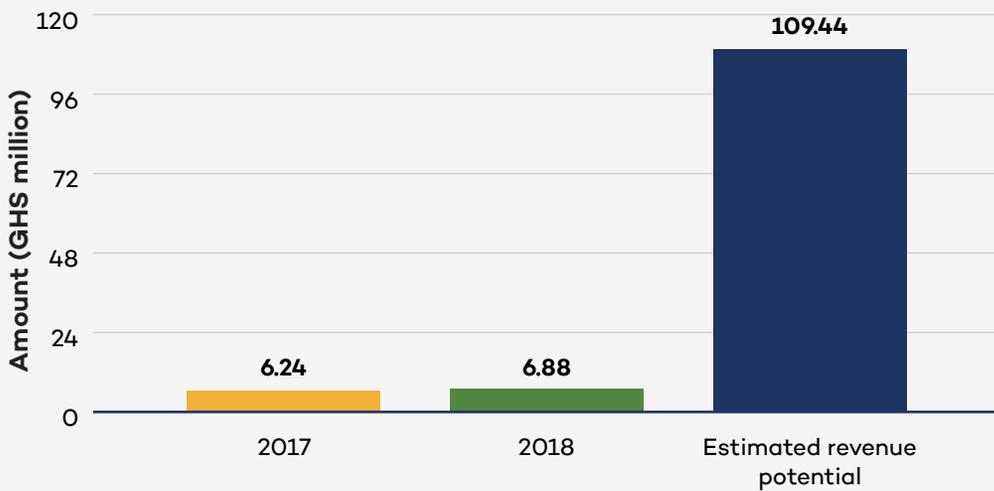
1. **Truckloads of quarry aggregates directly sourced from the mines were used as a proxy for production.** This approach was adopted to verify the production volume of quarry aggregates independently.
2. **A one-month shutdown and maintenance period was assumed to estimate the annual production volumes for each quarry site.** This shutdown period accounted for machine maintenance and public holidays.
3. **Annual production for the sampled sites was determined using a 95% confidence interval estimate** for accounting for potential variations in annual production and determining scenarios for production.
 - a. **Lower production scenario:** Accounts for the least attainable production volume value (lower confidence interval limit).
 - b. **Base production scenario:** Accounts for the second highest value of attainable production (point estimate of the annual production volumes).
 - c. **Upper production scenario:** Accounts for the maximum value of attainable production volumes (upper confidence interval limit).

Table 14.1. An estimate of the Government of Ghana's revenues from sample data

	Amounts (GHS million)		
	Lower production scenario	Base production scenario	Upper production scenario
Company costs and revenues			
Total revenue	401.94	558.86	715.78
Royalty payments	20.10	27.94	35.79
Operation and maintenance costs	133.98	186.29	238.59
Capital allowance	80.39	111.77	143.16
<i>Total payments</i>	<i>234.47</i>	<i>326.00</i>	<i>417.54</i>
<i>Net profit</i>	<i>167.48</i>	<i>232.86</i>	<i>298.24</i>

Amounts (GHS million)			
	Lower production scenario	Base production scenario	Upper production scenario
Government take			
Royalties	20.10	27.94	35.79
Corporate income tax	58.62	81.50	104.38
Total government revenue	78.71	109.44	140.17

Figure 14.1. Revenue potential and actual government revenues from the quarry sector (2017 and 2018)



Source: Boakye et al., 2021.



14.2 Background of the Technology

The idea consists of using a remote monitoring system to track the liftings of quarry aggregates and estimate sales by companies for appropriate taxation. It aims to empower and capacitate tax authorities to independently track the liftings (sales) of quarry aggregates to curtail incidences of underreporting and tax evasion. The proposed system would comprise laser scanning technology and software to accurately measure volumes of quarry materials carried by truck. It also has a cloud-based data storage, analysis, and sharing platform that affords real-time information sharing among state agencies.

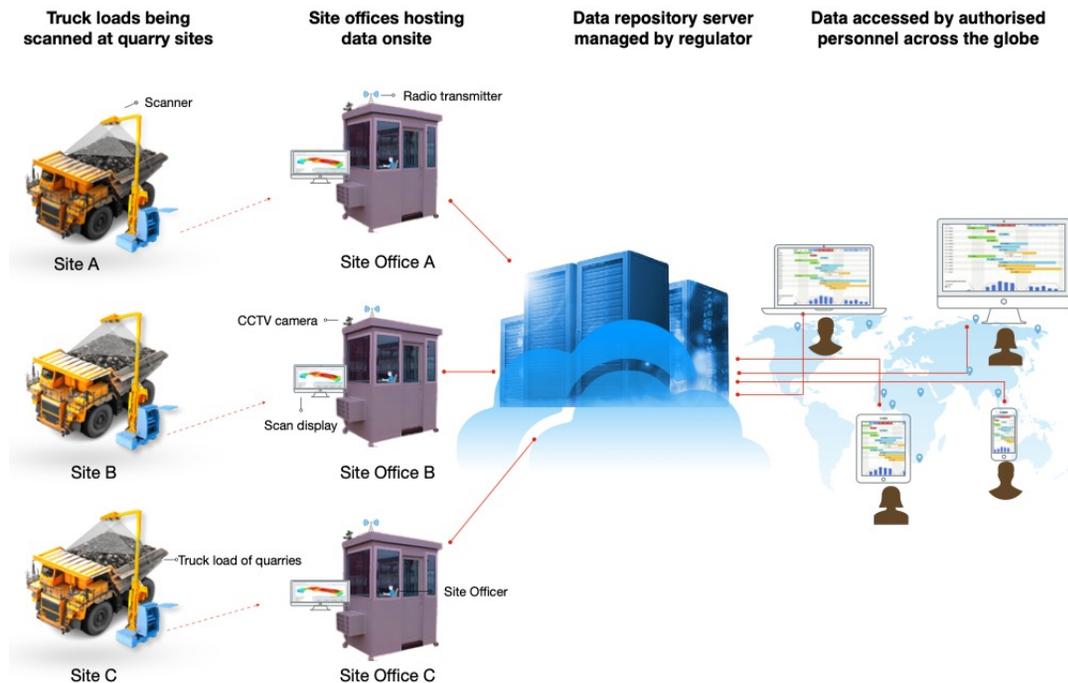
14.2.1 The Operational Mechanism of the Technology

Quarry aggregates are usually transported from the quarrying sites to customers using tipper trucks of varying sizes, usually measured in cubic metres. The remote monitoring system, mounted at various vantage points, makes it possible to scan the trucks as they drive beneath the scanner upon entry and exit. At the entry point, the scanner component of the system scans the truck to determine the initial volumes of quarry aggregates already contained in the entering trucks. The initial scan is important to ensure that the final volume measured reflects quarry aggregates lifted from the quarrying site and not aggregates imported from elsewhere.

Quarry aggregates are then loaded into the trucks using load haulage systems. The loaded trucks are scanned again to determine the net volume (i.e., the difference between the initial load upon entry and the final load). The second scanning determines the effective volumes of quarry aggregates lifted from the quarry site based on the initial volume measured earlier. The system automatically generates a receipt containing data on the type and volume of quarry aggregates lifted and the time of lifting. The truckloads' unit price and total price are generated, given that pricing information on the various quarry aggregates is already fed into the system.

Each respective quarry site generates similar information on volume loads and respective prices. At each quarry site, the information is managed by attendants or managers of the site. The relevant information is transmitted to a central data repository managed by the regulator or tax authority. Authorized personnel can query the data to obtain information on companies, products, or sales volumes for tax purposes. Figure 14.2 is a flowchart that graphically describes the monitoring system.

Figure 14.2. A graphical representation of the remote monitoring system



Source: ACEP; reprinted with permission.

The remote monitoring system provides regulators and tax agencies with accurate and real-time information on sales volumes for tax purposes. Other mature technologies used in the mining sector to monitor the production outputs of mining companies include Unmanned Aerial Vehicles (UAVs, e.g., drones) and weighbridges. Drones are flown over mining sites to examine areas prone to physical hazards (Behrman et al., 2019). They provide high-definition photographic evidence that effectively measures changes in quarry landscapes and estimates the size of the site and production stockpiles. However, they are less practicable in providing real-time monitoring of quarry liftings and sales.

Weighbridges could be a convenient alternative to the proposed technology if the information on quarry liftings could be accessed in real time by authorized tax and regulatory agencies. However, the system must be well calibrated to accurately convert the net weight of various quarry aggregates into their correct volumes. Measurement accuracy is essential since quarry aggregates are sold commercially in volumetric units (mainly cubic metres). The proposed monitoring system scans the content in the bin or dump box of the truck for volumetric assessment. Therefore, it provides a more accurate estimate of quarry aggregate volumes than weighbridges.



14.2.2 Expected Impact of the Technology

The proposed remote monitoring system is helpful for governments in obtaining relevant and accurate company and product-specific information for revenue mobilization and other monitoring purposes. Thus, the technology provides a more robust monitoring mechanism and prevents underreporting of production volumes, which impacts government revenues from quarrying sites.

The benefits of the technology are not limited to government agencies alone. Quarrying companies also benefit from accuracy in volume estimations and improved efficiencies in operations. For example, the proposed technology eliminates the need to manually count truckloads, thereby reducing inaccuracies related to this method. Further, remote monitoring technology ensures that accurate volumes of quarry aggregates are sold at the quarrying sites. Thus, customers receive the right amount of aggregates purchased, and companies receive payments for the amount of load they sell.

The technology can improve tax compliance among quarry companies, ensuring fair competition by eliminating pricing advantages for non-compliant companies. Finally, deploying the solution would provide a reliable, centralized point for ease of access to quarry production data and curb bureaucracy in data access, potentially attracting more investment to the sector.

14.3 Conditions for Implementation

The successful implementation of the system is premised on compliance by quarry companies. Successful implementation also hinges on there being funding available to invest in the technology. This section details some enhanced monitoring mechanisms and legislative changes needed to establish the system and ensure compliance. It also provides some information on the cost of the system and possible financing options governments can explore.

14.3.1 Reinforcing Remote Monitoring Mechanisms

Despite the potential benefits described in the previous section, the main risk is non-utilization. It is possible that some companies will evade the system by allowing trucks to use undesignated routes that avoid the scanning system. Faulty scanners and occasional server downtimes can also hamper the measurement and uploading of accurate information on quarry aggregates at various quarry sites.

Video surveillance tools such as cameras can accompany remote monitoring systems. These cameras will allow tax agencies to monitor quarry sites to detect any incidence of non-compliance by companies. The cameras can be mounted at vantage points to determine truckloads of quarry aggregates that enter and exit the quarry sites. The government must also conduct periodic visits to prevent illegal and unauthorized tampering with the remote monitoring technologies. In addition, the government must have a maintenance plan to ensure that the various monitoring technologies are in good condition and the right personnel to carry out the required troubleshooting and repairs when the monitoring systems develop faults.

Further, tax authorities must collaborate with subnational governments (or district assemblies) to provide information about specific quarry site operations. Usually, officers of the district assemblies are stationed at the entrance of the sites for the collection of tolls from truck drivers. These officials have useful information about the quarry sites and can assist in monitoring through effective collaboration with the tax authority.

Technology has advanced in many business operations within various sectors of the economy. Consequently, governments must consider leveraging technology to effectively improve their revenue mobilization potential and offering periodic capacity training sessions to hone their staff's technological skills.

14.3.2 Legislative Requirements

The proposed idea does not introduce changes in the fiscal regime of the mining sector. Instead, it seeks to improve revenue generation from existing sources through effective revenue reporting. Therefore, implementing the idea may not require any changes to the fiscal regime within the sector. However, the implementation of the technology may require some changes in the reporting guidelines by companies.

In Ghana, the Minerals and Mining (General) Regulations, 2012 obligate holders of mining leases to keep complete and accurate records of mining operations. These records include production volumes, quantities sold, revenue received, and royalties payable. The law further requires the records to be maintained in an acceptable format and submitted monthly to the sector regulator. This law could be amended to expressly require companies mining industrial minerals to provide invoices from the government-approved remote monitoring system. This amendment should address

- The installation of approved remote monitoring systems at industrial mineral sites.
- Guidelines on the utilization of remote monitoring systems.
- Roles and responsibilities of the government and companies regarding the operation and maintenance of the system.

Finally, in the rare event that stabilization clauses in existing leases hinder the enforcement of volume scanning system requirements, enhanced engagement efforts and the renegotiation of contracts may be required.

14.3.3 Implementation Costs and Financing Options

The main costs for implementing the technology are capital and installation costs for the equipment, operation and maintenance, and the cost of capacity building for government officials. Interactions with remote monitoring system providers reveal that the average unit cost of such technologies ranges from USD 80,000 to USD 100,000 per site, depending on the technical specifications and the customization required. Operating and maintenance costs account for between 4% and 10% of the price of the technology. Companies that provide sales and support services for such remote monitoring systems include LASE, Modular Mining, Walz, and LoadScan.⁸⁴

There are numerous ways that governments could finance the installation and operation of remote monitoring technologies. The funding options could vary between existing and new quarry companies. For newer quarry concessions, regulation could require that they install the requisite remote monitoring systems at their sites. For example, the Government of Queensland, Australia, requires that holders of mineral resource rights (mineral resource authority holders) release the results of remote sensing surveys to the responsible authorities (Department of Resources, 2021).

Two financing options are available for older quarries. First, the government could consider investing in the technology at the various quarry sites. However, this option requires significant upfront investment. Alternatively, the government could provide carefully designed fiscal incentives to encourage quarry companies to invest in monitoring systems. For example, accelerated depreciation allows companies to write off their capital costs within a shorter space of time than the norm for the technologies over their useful economic lives. At face value, this treatment would not change the total amount of depreciation to be charged; however, it would increase the present value of the depreciable amount by bringing them forward and making them closer to the time the technologies are adopted. Governments considering this option should make sure that the additional revenue gained from effective monitoring of quarrying activities outweighs the cost of deferring tax payments.

14.4 Conclusion

Industrial minerals, such as quarry aggregates, can provide a substantial revenue stream for many developing countries. However, limited monitoring of the sector prevents governments from taking advantage of such revenue generation potential. Within the current context of digitization, technological advancements can provide practical and effective approaches for regulators and tax agencies to monitor operations within the

⁸⁴ For more information on each of these monitoring systems, please see: LASE, https://lase-tvm.de/en/?utm_source=google&utm_medium=cpc&utm_campaign=12912425208&utm_content=121102742349&utm_term=load%20scanner&gclid=CjwKCAjwwo-WBhAMEiwAV4dybSPolxaySTnnbc1JcLq0vaJG1QqjsnSkBC7nmYfv8AJ6ESICCFOR0hoCJboQAvD_BwE; Modular Mining, <https://www.modularmining.com/our-solutions/load-and-haul/>; Walz, <https://www.walzscale.com/truck-scales-in-mining/>; LoadScan, www.loadscan.com

sector. Leveraging technology enables agencies to independently verify reported quarry production volumes and sales to collect appropriate taxes and royalties.

ACEP proposes a remote monitoring system to enhance regulation in the quarrying sub-sector. This study is a practical description of a monitoring technology that was recommended after assessing the revenue generation potential of Ghana's quarry industry. It demonstrates that volume scanning systems mounted at the entrances and exits of quarry mines can accurately compute the volume of liftings of quarry materials. This information is then wirelessly transmitted to and hosted on a cloud-based data platform that can be accessed by tax administrators, mining sector regulators, and other subnational or local assemblies.

Some changes in regulations may be needed to implement the technology. These regulatory changes would give tax authorities the mandate to install the system on each quarry site and require companies to provide data on sales volumes generated by the system for taxation purposes. Governments could partner with quarry companies to meet the cost of the technology.

The proposed technology is commercially mature and easy to implement. It holds the potential to increase domestic revenue mobilization from the quarrying sectors to support the budgets of resource-rich developing countries.

14.5 References

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Chapter 15.

Navigating Existing Legal Frameworks and Obligations

15.1 Introduction

The economic, political, and social contexts that shape the governance of resource-rich economies have significantly evolved in the last 30 years. The policy options contained in this handbook reflect these changes; however, they do not exist in a vacuum. Any policy changes need to be made with an awareness of the country's existing legal framework and obligations.

This chapter highlights some of the legal issues countries may encounter when making changes to their mining fiscal regime. Section 15.2 identifies the relevant sources of law that typically govern mining revenue collection, and that may need to be amended or replaced. These laws include domestic law, investment contracts, double taxation agreements (DTAs), and international investment treaties (referred to as simply “investment treaties” herein). Sections 15.3.1 and 15.3.5 raise some legal issues that could arise, particularly in the context of fiscal stabilization agreements and similar provisions in investment treaties; accordingly, Section 15.3.5 proposes some administrative law actions that countries may wish to adopt in order to ensure that any policy changes align with general principles of good governance.

15.2 Identifying the Relevant Sources of Law

Before commencing any reforms, government officials will need to determine the sources of mining fiscal law within the country's jurisdiction. This will indicate where and how to make changes to ensure legal and policy coherence, as well as provide clarity for investors and government agencies. Policy reforms that are not coherent with the legal framework risk contradicting existing obligations.

Mining fiscal regimes are typically found in three sources of law:

1. The general income tax code, which may include special provisions for mining, either in a separate schedule or chapter or in the main part of the code.
2. Mining law, which may contain more detail on the sector-specific fiscal regime.
3. Mining contracts or investment agreements that set out the fiscal terms applicable to a specific investor.

Some countries may also need to consider interactions with other instruments, such as the constitution, investment codes, labour laws, energy laws, laws specific to large investments, environmental laws, local government decrees, and regulations.

At the international level, legal instruments such as DTAs and investment treaties may also impact the adoption and implementation of mining fiscal policy reforms. It is worth noting, however, that both DTAs and investment treaties are under considerable scrutiny, particularly with respect to their impacts on developing countries' ability to levy and collect taxes (Aisbett et al., 2018).⁸⁵ While coherence is an important goal, policy-makers should not be unnecessarily constrained by outdated or unbalanced international legal instruments that themselves require reform.

DTAs govern the allocation of taxing rights between two contracting states on income from cross-border transactions (Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development [IGF], 2021). They cannot create new tax liabilities; however, they can limit the scope of a country's taxing rights. For example, a DTA may reduce the rate of the withholding tax on interest expenses compared to domestic law (IGF, 2021). Consequently, changes that a country makes to its mining fiscal regime may not automatically alter its obligations and rights under existing DTAs unless it also chooses to renegotiate the relevant DTAs.

Investment treaties are concluded between states. They set out the conditions of treatment for private investment by nationals and companies of one country in another country.⁸⁶ Investment treaties typically provide strong legal protection to covered investors, including mining investors, with respect to their investments in a host country, including in relation to taxation. Any changes to the mining fiscal regime should be as closely aligned with a country's broader investment framework as possible in order to mitigate the risk of investment-related claims.

Having identified the sources of law that a government may need to amend to give effect to the chosen policy, the next section evaluates the potential legal issues that may arise in the process.

⁸⁵ For a further discussion on the ongoing reforms, see Organisation for Economic Co-operation and Development [OECD]. (2021) *The future of investment treaties: Background note on potential avenues for future policies*. <https://www.oecd.org/daf/inv/investment-policy/Note-on-possible-directions-for-the-future-of-investment-treaties.pdf>

⁸⁶ For further analysis on the use of investment treaties, see International Institute for Sustainable Development, 2011.



15.3 Potential Interactions Between Policy Reforms and Fiscal Stabilization

Countries have the right to tax companies operating within their jurisdiction subject to any limitations negotiated in DTAs (Vann, 1998). Subject to these constraints, applying a new model of financial benefit sharing to new mining investors should be relatively straightforward from a legal standpoint: no formal legal commitments have been made. Some new investors may request the same tax treatment as existing investors, but states are unlikely to be under any legal obligation to agree to this, provided that the reforms are non-discriminatory (see the discussion on investment treaties below). Existing investments are more complex, particularly those subject to fiscal stabilization provisions in mining contracts.

Mining is a long-term, capital-intensive industry. It follows, therefore, that investors need a predictable investment environment, including the fiscal regime, in order to make reliable investment decisions. The 2020 OECD *Guiding Principles on Durable Extractive Industry Contracts* define a “predictable fiscal regime” as one that “includes responsive terms defined in legislation and/or the contract to adjust the allocation of overall financial benefits between host governments and investors to variables that affect project profitability (such as variance in commodity prices, costs, production volume, or resource quality), contributes to the long-term sustainability of extractive contracts and reduces the incentives for either party to seek renegotiation of terms” (OECD, 2020). As can be seen from the text, a predictable regime is not necessarily one that stays the same but adapts to new circumstances while maintaining an appropriate sharing of benefits between the host state and investor.

Many mining investors and countries have gone a step further by seeking (and granting) legal certainty with respect to fiscal obligations (Otto, 2018). This step is typically in the form of fiscal stabilization clauses. Fiscal stabilization clauses are provisions in mining contracts, permits, or the national legislation of the mining host state that purport to limit or set conditions on the application of newly adopted government fiscal measures, primarily laws and regulations, for an existing mining project before the new laws or regulations are adopted. The provisions typically come in two forms: freezing clauses and economic equilibrium clauses. Freezing clauses are designed to lock in the fiscal terms at the time of signing the mining contract for the duration of the project, exempting it from any change to the domestic mining tax law. Economic equilibrium clauses, on the other hand, do not prevent the state from changing the fiscal terms that apply, provided it compensates the investor for the expense of complying with the changes. It may also be achieved by requiring the parties to negotiate any amendments to the contract in good faith and in a manner that restores the economic equilibrium initially envisioned in the contract.

Fiscal stabilization clauses are controversial, particularly among developing countries, where they predominate (Ruggie, 2008).⁸⁷ The most recent recommendations from the OECD confirm that fiscal stabilization is not an automatic requirement but should only be used where there is a clear commercial need, and even then, stabilization clauses should be limited in scope, time, and subject to review (this is discussed in detail in Section 15.3.3). This is a significant shift from the past, where stabilization clauses were granted automatically, often locking in unsustainable financial benefits for the investor. In the 1990s, Zambia entered into stabilized development agreements with numerous multinational mining companies (Ng'ambi & Mwinga, 2018, p. 45). These agreements fixed the royalty rate for copper at 0.6% of gross revenues, substantially less than the statutory rate of 3%. These terms were stabilized for 20 years, during which the price of copper increased significantly. Zambia terminated the agreements in 2008. All mining investments are now subject to fiscal conditions set out in the country's domestic law (Manley, 2017, p. 5). The mining industry has also recognized the growing complexities surrounding the issue of fiscal stabilization,⁸⁸ leading to several companies becoming actively involved in developing the recent OECD recommendations.

The next sections expound on the potential interaction between new models of financial benefit sharing and existing mining investments covered by fiscal stabilization clauses.

15.3.1 Every Stabilization Clause Is Different, Requiring Case-By-Case Analysis

Fiscal stabilization clauses vary in many respects, notably in nature, scope, and time period. This lack of consistency makes it difficult to generalize about the potential interaction between such clauses and the introduction of new fiscal policy measures. Those interactions will depend on a case-by-case reading of the precise wording of the fiscal stabilization provision. There are at least three things to consider when reviewing a stabilization clause: (i) what taxes it covers, (ii) the duration, and (iii) whether it is a freezing or economic equilibrium clause.

First, fiscal stabilization clauses can be broad or selective in what they cover. A broad stabilization clause will cover all taxes and charges that apply to the investment. Selective stabilization clauses cover key fiscal terms but not all fiscal terms. Some clauses may cover tax rates but not the base; others may expressly limit the application of stabilization clauses when it comes to policy measures intended to curb tax avoidance. The scope of the stabilization provision will be an important factor in determining potential interactions with

⁸⁷ A 2008 International Finance Corporation report by Ruggie found that stabilization clauses were most prevalent in sub-Saharan Africa and other developing country regions and, at the time, were essentially non-existent in OECD countries. These clauses tended to be the most extensive in developing countries, in terms of both substantive scope and duration.

⁸⁸ "Mining agreements have often locked in fiscal conditions to safeguard companies from future (arbitrary) legislative changes. These clauses have become a contentious issue. Some argue that investors were provided with enhanced protection at a time when the bargaining position of countries was particularly weak" (Mann & Readhead, 2018).



new fiscal policy measures. Good practice suggests that countries that choose to grant fiscal stabilization should limit it to specific taxes or aspects of the fiscal regime (OECD, 2020).

The time period of a fiscal stabilization clause is another important consideration. If granted, governments should limit fiscal stabilization provisions to a defined time period, not the full life of a contract or investment, and thus, inherently, the contract would not be up for renewals or extensions (OECD, 2020). There are many instances of contracts with indefinite fiscal stabilization clauses.

Finally, as explained earlier, some stabilization clauses “freeze” the relevant fiscal provisions applicable to the investment in time, while others require that the government compensates the investor for the additional cost of complying with the new measure. The economic equilibrium option allows more flexibility to apply new policies to existing investments, subject to the need to compensate the investor if they disturb the agreed-upon equilibrium.

A case-by-case analysis of the precise legal wording of the stabilization provision will determine how it interacts with new policy measures, if at all.

15.3.2 Judicial Interpretation of Fiscal Stabilization Provisions

It is difficult to say how a tribunal is likely to interpret a stabilization provision because there are very few publicly available awards on the matter (Gehne & Brillo, 2014). The publicly available cases demonstrate that tribunals have tended to read and apply stabilization provisions in a black-letter manner. In other words, they have tended to apply a stabilization clause precisely as it reads (Umirdinov, 2020, p. 477). If it is very broad—for example, including all taxes applicable to a specific mining project—the provision will likely be applied that way. If the clause includes specified taxes, they will be covered but not others. Nothing will be read in or out of a clause that is applied by a tribunal.⁸⁹ The existence of an investment treaty may further compound a black-letter interpretation of a stabilization clause (this is discussed in detail in Section 15.3.4).⁹⁰

However, there have been some notable developments in how tribunals interpret stabilization clauses over the past 30 years (Gehne & Brillo, 2014). Some are, for example, beginning to give greater consideration to the context surrounding the alleged breach of stabilization. In the LETCO v. Liberia case, the tribunal held that the purpose of stabilization was to protect companies against arbitrary actions of the host state but could not totally impair the sovereign power of states, including the right to regulate. It is unclear how future tribunals will interpret such clauses; hence, governments should be judicious in their use of fiscal stabilization.

⁸⁹ In *Parkerings v. Lithuania* the tribunal held that “a state has the right to enact, modify or cancel a law at its own discretion. Save for the existence of an agreement, in the form of a stabilization clause or otherwise.”

⁹⁰ In those instances, tribunals have in the past found that by changing the applicable governing regime, the host state has breached the fair and equitable treatment standard and thus frustrated the company’s legitimate expectations.

15.3.3 Normative Shifts in the Design and Use of Fiscal Stabilization Clauses

The introduction of new fiscal policy measures should be viewed in the context of an evolving normative framework surrounding the design and use of fiscal stabilization provisions. This is best reflected by the OECD 2020 Guiding Principles on Durable Extractive Contracts. The Guiding Principles were developed through a multistakeholder process over many years. Although legally non-binding, the Guiding Principles are an indication of a growing consensus on the changing role of stabilization clauses within the extractive industries.

Principle VIII of the Guiding Principles acknowledges the legitimate need for fiscal predictability within the sector. The commentary elaborates that a responsive fiscal regime is one that anticipates various profitability scenarios, allows both investors and governments to reduce the risk of incomplete information at the time of contracting, rebalances the sharing of financial benefits, and is flexible to price changes (OECD, 2020).

The Guiding Principles are also clear that fiscal stabilization is a commercial choice by governments, not an automatic legal requirement (OECD, 2020). Stabilization should only be used if there is a demonstrable commercial need—it should not be an essential requirement in all resource contracts. If the government believes that fiscal stabilization is needed, it should be limited in scope and used to reduce identified risks and not generally perceived risks. The scope should be limited to key fiscal terms, subject to strict time controls, and possibly apply a stability premium to the tax rates so the investor, in effect, purchases the stabilization regime from the state. Finally, the Guiding Principles suggest that new fiscal policy measures that protect against tax base erosion and profit shifting, which are consistent with international practice, should not be constrained by stabilization clauses (OECD, 2020).

Considering these normative shifts, as well as changes in the sector and society, mining investors may wish to renegotiate stabilized investment agreements if it would lead to a more balanced, sustainable sharing of benefits with the state (IGF & African Tax Administration Forum, 2020, p. 5). The recent renegotiation between the Government of Tanzania and Barrick Gold to adopt a profit split shows that it is possible to incorporate new policy ideas into existing stabilized agreements if both parties are willing (Barrick Gold Cooperation, 2020). It is worth noting that Tanzania only sought to renegotiate the most critical agreements and did not embark on a general renegotiation exercise. These normative shifts are also likely to be relevant for future tribunals when interpreting stabilization provisions.

15.3.4 Legal Issues Arising from International Investment Treaties

Stabilization provisions in specific contracts are often complemented by provisions of a similar nature in investment treaties. The most relevant standards of protection for the purpose of this chapter are fair and equitable treatment (FET) and national treatment.⁹¹

⁹¹ Tax matters are commonly excluded from the scope of the most-favoured nation clause. Expropriation clauses will only be relevant where the amendments made constitute a disproportionate taking beyond the regular taxing powers of a state.



The national treatment standard requires that countries treat all investors equally, whether they are foreign or domestic investors. In other words, any new policy measure should apply to all investors, domestic or foreign, regardless of nationality, otherwise, it risks breaching national treatment (United Nations Conference on Trade and Development, 2021). There are circumstances that could justify the “legitimate” differential treatment of foreign and domestic investors. Some treaties limit the application of the national treatment standard to only investors “in like circumstances.”⁹² However, these limitations must be clearly spelled out in the investment treaty. An example of this might be the application of certain fiscal policies to strategic mineral deposits. Older generation investment treaties more commonly contain unbridled national treatment standards. Therefore, before enacting changes that could result in the discriminatory treatment of foreign and domestic investors, countries should assess the nature of any implicated national treatment clauses in their investment treaties.

The FET standard provides legal grounds for investors to challenge decisions taken by states in the exercise of their regulatory power, even where they are pursuing public interest objectives.⁹³ FET has been used by investors to challenge changes to the domestic regime, including the withdrawal of tax incentives, the suspension of tariff adjustments for public utilities, or the refusal to reimburse taxes, among others (Uribe & Montes, 2019). Ultimately, the process that governments follow when making changes to their domestic law is likely to be the main determinant of whether FET has been breached. Changes should be transparent, fair, made in accordance with the full law-making process of that jurisdiction, and applied in an equitable and consistent manner.

The picture is more complicated when there are stabilization clauses at play because investment tribunals have widened the interpretive scope of the doctrine of legitimate expectations under FET, which captures various government conduct, including changes in general law (Sarmiento & Nikièma, 2022, p. 5). This interpretative practice has led some investors to believe that treaties grant them the legitimate expectation that the conditions that were applicable when the investment was made will not change over time or that specific commitments made by states in contracts or laws will not be modified, even though this is not the intention of the FET standard of treatment (Ostřanský, 2018, p. 346).

Umbrella clauses in investment treaties may further extend the application of stabilization clauses in individual contracts (Gehne & Brillo, 2014). Umbrella clauses convert any independent contractual obligations between the state and an investor into the equivalent of a treaty obligation. This enables the investor to bring claims based on a breach of contractual terms against the host state through the investment agreement’s dispute resolution provisions. Where an applicable treaty holds an umbrella clause, investors may claim that the contractual stabilization clause is elevated to the status of being a treaty obligation by virtue of the umbrella clause and, as such, is actionable under the treaty.⁹⁴

⁹² See *Occidental v. Ecuador (I) Occidental Exploration and Production Company v. Republic of Ecuador (I)* (LCIA Case No. UN3467).

⁹³ For a more detailed discussion on FET see Sarmiento & Nikièma, 2022.

⁹⁴ In *CMS Gas Transmissions v. Argentina* paras 145–146, for example, the claimant relied on a specific undertaking that an applicable tariff structure would not be amended without the licensee’s consent. The tribunal found that such undertakings were valid and enforceable based on the umbrella clause in the relevant investment agreement.

Understanding the scope of various investment agreements, as well as the interaction between these agreements and other sources of law, is a complex exercise. Each treaty should thus be read on a case-by-case basis to determine the precise scope of any legal obligations that states may or may not have toward existing investors and any interactions with the proposed reforms.

15.3.5 Administrative Aspects of Enacting Mining Fiscal Policy Changes

Governments should make changes to the fiscal regime in accordance with general principles of good governance, including having clear, measurable objectives for the new fiscal policy. These objectives should be publicly stated and subject to public consultation. The policy-making process should be transparent. There should be consultation with industry, citizens, and all government agencies involved in mining revenue collection. Consultation should not be viewed as a purely legislative requirement but as a means of ensuring the relevance and correct design of new policies. Finally, the policy changes should be applicable to all mining investors, subject to any explicit conditions the government may set to limit the application of new policies to certain investments—for example, strategic mineral deposits. Any differential treatment between investors should be underpinned by a clear, publicly available policy rationale. To the extent that these policy changes are contained in contracts, they should be made public so the fiscal terms can be monitored by the public.

15.4 Conclusion

The global context in which the extractive industries operate has changed significantly in recent years. The energy transition and rise in demand for critical minerals, for example, require that countries rethink how they benefit financially from their mineral wealth. This may involve making changes to the mining fiscal regime. It is important that such changes are consistent with the broader legal framework and carried out in a transparent and predictable manner. Some countries may have specific obligations to existing investors that they need to consider. These need to be reviewed on a case-by-case basis to understand the precise interactions with any policy changes. However, where possible, countries should not refrain from making necessary and legitimate changes to their existing fiscal regime because it will violate pre-existing instruments where these policies are no longer fit for purpose and there is legal scope for amendment. Investors are encouraged to work with countries to update their fiscal regimes to reflect changes in the sector and society and to ensure sustainable partnerships for the future.

15.5 References

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