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The taxation of extractive industries: Mining

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WIDER Working Paper 2017/75

The taxation of extractive industries

Mining

James M. Otto*

March 2017

Abstract: The taxation of the mining industry varies considerably from nation to nation. This paper reflects on the evolving use of various taxation approaches applied by governments to the mining sector. It includes a description of the principal tax types and investment tax incentives and briefly describes the main policy issues pertaining to mineral sector taxation. The author concludes that governments when devising mineral sector fiscal systems should carefully assess their fiscal options in a holistic approach that anticipates commodity price cycles, and that mining companies should anticipate fiscal system changes that reflect the evolution of the political economy in which they operate.

Keywords: mining, mining taxation, royalties, additional profits tax, transfer pricing, revenue stabilization fund

JEL classification: O13, Q3, H2, F3

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1 Mineral taxation: A general overview

1.1 Introduction

Governments have probably been taxing mines ever since governments began taxing economic enterprises. What have governments learned over time? Basically you need to achieve balance—if you tax too heavily in the short term, over the long run the tax base is reduced because investors will shy away from new investment, and if you tax too lightly, society may feel slighted that it is not receiving its fair share of benefits. Though the above principle is simple, its implementation is not, and tax policymakers grapple with how to create a balanced tax system on an ongoing basis. Mineral prices fluctuate widely, more so than many other commodities, which complicates achieving a balanced approach. While there are tax tools that assist in accommodating wide price fluctuations, many governments simply adjust rates and bases to react to commodity price cycles. This paper examines some of the issues that are of current interest to tax policymakers.

1.2 Mineral rents

The academic literature is replete with the treatment of the concept of economic rent—a surplus of income that can theoretically be taken away from an investor without altering its economic behaviour. Economists have long toyed with the concept that the taxation of a mine can be adjusted to capture its economic rent. In practice, few nations attempt to capture all economic rent, but all taxes, and especially taxes such as income tax, excess profits taxes and additional profit taxes do appropriate at least some economic rent for the benefit of the state. It is beyond the scope of this short discourse on mine taxation to delve into the extensive literature on the application of economic theories concerning mineral rents to the design of taxation policy in the mineral sector.¹ While tax policymakers may grasp the theoretical concept of economic rent, most are more concerned about achieving a real-world balance that satisfies investors and society.

1.3 Evolution of mineral taxation schemes

Mineral sector taxation systems tend to evolve reflecting the current state of the business cycle. When mineral commodity prices are high, mineral-led economies tend to adjust their tax systems to capture more of the perceived excess profits and when prices are low, systems are adjusted to allow mines to remain economically viable. The most common way to adjust the mineral sector taxation system is through the manipulation of royalty schemes, because such schemes do not affect other types of taxpayers. Recently, as a result of the commodity ‘super-cycle’ commencing around 2002, there was a resurgence of interest in self-adjusting taxation approaches designed to appropriate ‘excess profits’ either based on rate-of-return measures (Liberia, Malawi, Solomon Islands, and Zimbabwe) or annual profit-to-cost ratio principles (Chile and Peru).² Tax schemes imposed during times of rising prices are vulnerable to repeal when prices fall or investors shy away. For example, Australia imposed a resource rent type tax when the super-cycle became apparent but repealed it shortly thereafter when prices dropped. Likewise, new taxes driven by the super-cycle in both Zambia and Mongolia were short-lived, and other nations have reconsidered their royalty rates.

¹ For an introduction to mineral rent theory and taxation see Tilton and Guzman (2016), Boadway and Keen (2013), Land (2010), Otto et al. (2006), Cordes (1995), and Land (1995).

² For a modern history of resource rent types of taxes applied to mining see Land (2010).

Governments have several direct ways of participating in the sharing of income generated by mines. The simplest way is through taxation. Another route is for the government to establish a state mining enterprise that itself operates mines, or to enter into some sort of joint-venture interest arrangement with a private investor that entitles it to a share of profit or dividend distributions. However, the trend over the past several decades has been to emphasize taxation and few nations today directly mine minerals or take a majority equity position in mines. Worldwide, the trend has been to privatize state-owned mines (for example, in Malaysia, Peru, Poland, and Russia) and today their governments look to taxes, not dividends, for fiscal revenues. Other nations that formerly owned mines have partially privatized them by reducing the state's equity to a minority share, such as ZCCM Ltd. in Zambia.

Over the past two or three decades there has been a trend to rely on laws rather than negotiated agreements to set out taxation schemes for large projects. For example, Indonesia, which developed the 'Contract of Work' that has been widely emulated worldwide in mining agreements since the early 1970s, has abolished such agreements and now miners are subject to tax under the general tax laws. Negotiated mining agreements played an important role in many mineral-led economies that lacked an adequate system of laws to accommodate large-scale projects, but as legal systems have matured, the need for them has waned in many nations. In this author's opinion, the time for such agreements has passed, and nations that still use them should concentrate their efforts on strengthening the underlying system of laws, rather than spending the considerable time and effort it takes to negotiate them.

When considering fiscal reform, whether through changes to taxes or equity options, it is important to examine the system as a whole, not just a component part. For example, when comparing royalty rates in different nations, one should not be too concerned if the rate is higher or lower than in another nation because other tax types may offset the difference in royalty (for example a lower or higher income tax rate). Today, many nations make use of project fiscal modelling to aid with tax reform policy analysis. Mine fiscal models allow a holistic assessment, taking into account the impact of all taxes on a typical or model mine, and provide the ability to carry out a sensitivity analysis of the impact of various scenarios on measures such as internal rate of return and total effective tax rate. For example, Peru was interested in changing its approach to mine taxation and it commissioned fiscal modelling to assess its competitive position with other countries³, and it conducted fiscal scenario modelling exercises before moving forward with two rounds of mineral-sector-related fiscal legislation. Such analysis has become more routine and accessible with the availability of tools such as the Fiscal Analysis of Resource Industries Methodology and supporting software developed by the International Monetary Fund (IMF 2016). Many governments that lacked confidence in their capacity to conduct fiscal system analysis have sought outside assistance from organizations such as the IMF, the Commonwealth Secretariat or specialist consultants, such as this author. In this author's experience, nations that analyse the impact of a variety of tax scenarios using modelling have more stable fiscal systems and are better able to attract investment on a continuing basis.

While various tax rates and bases have changed over the past several decades, the basic mineral sector taxation methods have remained more or less the same, with the exception of the introduction of general value-added taxes (VAT) in many nations and a new form of additional profits mining tax in Chile and Peru. In this author's opinion, the greatest strides recently have been in tax administration where the capacity of governments has strengthened, particularly in mineral-led developing economies. Many governments have established specially trained large-

³ See Otto et al. (2000) and Otto (2002).

taxpayer compliance units. For nations that still have weak tax administration capabilities, simpler taxes remain preferable to more complex types. For example, the author, when meeting with officials in the tax authority of an African nation, learned that none of them knew how a new excess profits tax (crafted by external consultants and passed into law) was calculated or were familiar with the concept of internal rate of return.

Unfortunately, the progress made by tax authorities to stem fiscal leakages resulting from transfer pricing practices remains slow in both developed and developing economies. While input and output transfer pricing mechanisms are well known, the ability of governments to address these practices has remained weak. In this author's opinion, most nations today have developed their mineral sector tax systems to achieve a 'theoretical' fair balance between national and investor interests, but transfer pricing linkages remain a major challenge that distorts actual revenue collection.

1.4 Revenue distribution

Fiscal revenues generated by mining enterprises can be substantial and where they form a large part of the revenue, their distribution can be controversial. Subnational governments obtain their revenues from two principle sources: through the annual allocation of the national budget and from earnings that they obtain from the collection of various taxes that they are empowered to collect. Often, the respective tax powers of central and subnational governments are set out in the nation's constitution. In many nations, there is tension between the various levels of government regarding revenue distribution and taxing powers.

Subnational governments in areas that have mines often profess that since the minerals come from lands within their jurisdictional boundaries, they should receive preferential distribution. Subnational governments in areas without mines take a more egalitarian view—mineral revenues should be distributed equally or in such a manner that will do the greatest number of beneficiaries the greatest good. Otto (2001) has observed that in practice, there is often a bias in mineral sector fiscal systems towards those areas in which minerals are mined either through statutorily defined distribution mechanisms or through the devolution of taxing powers to subnational government. In many developing nations there is a trend for subnational governments to acquire a greater portion of the tax or royalty take, either through statutory allocation of certain tax receipts or through direct taxation, as they gain administrative capacity. For example, over the past several decades, subnational governments have seen a greater portion of tax taken in nations as diverse as Brazil, Peru, Madagascar, Papua New Guinea, and Indonesia.⁴ In Brazil, the royalty is split as follows: 23 per cent to the state in which the mine is located; 65 per cent to municipalities; 2 per cent to the national fund of scientific and technological development; and 10 per cent to the mining ministry, of which 2 per cent is earmarked for environmental protection in the mining regions. Provincial and local taxes are described in a subsequent section of this paper.

1.5 Special aspects of the mining industry and the tax policy response

Tax policymakers grapple with the issue of uniqueness. Should a uniform taxation system be applied to all economic sectors or should a more complicated system be developed that takes into account the unique attributes of each sector? Each sector in an economy has different cost, revenue, and related profit attributes. Additionally, government objectives for various sectors may differ—for example maximizing employment, providing security of supply, generating revenue,

⁴ A variety of distribution mechanisms used in Australia, Canada, Chile, Ghana, Indonesia, Peru, and Tanzania are described in ICMM (2009).

and so forth. The willingness of investors to invest in a sector may be impacted by how that sector is taxed, and if the taxation system is different for each sector of the economy, will preferential taxation cause detrimental distortions in the economy? Additionally, if the tax system is non-uniform, it will be inherently more complex and relatively more difficult to administer.

Otto (2001) has observed that most governments afford the mining sector special tax treatment, taking into account those attributes that distinguish it from other sectors. This section briefly examines several mineral sector tax discrimination issues and related policy approaches. The treatment below is not exhaustive, and it is not uncommon to witness other discriminatory taxation practices.

Discrimination by mineral type. Because operational economics may differ from mineral type to mineral type, many nations statutorily define groups of minerals that are subject to different royalty rates. For example, diamond mines have the potential to generate profit levels that may not be obtainable by a gravel mine, and the royalty rate for diamonds will be set higher than that for gravel mines.

Discrimination by level of investment. Mines come in many sizes and some are on a commercial scale while others are artisanal. Many nations exempt artisanal miners, whether licensed or not, from paying royalty, in recognition of the fact that tax enforcement is unrealistic. Unlicensed artisanal miners may avoid paying the royalty but they also cannot claim back VAT on their purchased inputs and equipment. Small-scale miners may enjoy a reduced royalty or royalty exemption and may also be subject to a low-income tax rate if the system is graduated. Very large mines and mines owned by the political elite may be offered the opportunity to negotiate unique tax terms in a special agreement with the state. Large, expensive to build, long-lived mines may be offered the ability to stabilize all or some types of taxes for a defined time period. To entice investment in a large project or to aid in project financing, a few nations, such as Indonesia and the Philippines⁵, provide a ‘holiday’ from one or more types of taxes for qualifying projects.

Discrimination by nationality. Bilateral investment and double taxation treaties offer special tax treatment for investors from the signatory nations; this may be unavailable to investors from non-treaty countries.

Discrimination relating to costs.

Exploration expenses. Exploration expenses will be incurred before taxable income is available. Governments provide special provision for how pre-production (pre-income) exploration expenses are handled for future income tax purposes. Many nations allow exploration expenditure to be carried forward to the first year of mineral production, when the accumulated expenditure is either expensed or amortization is commenced.

Mine development and equipment. The development of a mine is dependent on specialized equipment and the developer will initially need to import large quantities of equipment from specialized foreign suppliers. Many nations exempt mining equipment from import duty and VAT during at least the initial development period. Other nations provide refunds or apply zero-rating schemes that have the same impact as an exemption. Mines are capital intensive and large expenditures are required before

⁵ Details are reported in PWC (2012).

operations can commence. Many governments recognize the capital intensity of the industry and provide various means to accelerate recovery of capital costs (i.e. depreciation) once production commences.

Discrimination relating to export sales. Many mine products are often destined for highly competitive international markets. Many governments impose no (or very low) export duties on minerals and provide a means whereby VAT on export sales is either not applied or applied in a way that allows for a refund or credit.

Discrimination relating to commodity price cycles. Mines produce raw materials used to make other things and are vulnerable to substantial price changes on a periodic, business-cycle-related basis. Some countries allow royalties to be waived or deferred from time to time for projects experiencing short-term financial stress and most countries provide for the carrying forward of losses.

Discrimination based on post-production expenses. After a mine closes and there is no sales income, it may incur significant costs relating to the closure and reclamation of the site. Many governments require a set-aside of funds or guarantees to cover closure and reclamation costs in advance of closure, and provide some sort of deduction for this set-aside against current income tax liability. It is common in modern legislation for the mandated set-aside of funds or guarantees to be adjusted periodically to account for changed circumstances and inflation, and related deductions can occur on an ongoing basis.

1.6 Transparency

The disclosure of tax payments by commercial enterprises is a delicate fiscal issue in most nations. In a competitive world, information on a rival's payment of its various taxes can provide a competitive advantage. Many governments accept this principle and hold such payment information confidential. On the other hand, the public may be concerned that payments to government, perhaps to the executive branch or to a tax authority controlled by the political elite, can result in corrupt or questionable practices. One of the challenges faced by tax policymakers is how to balance the need for commercially necessary confidentiality with the public's need to hold the government accountable for how it receives and uses fiscal remittances.

Mineral sector taxation transparency is an issue that has seen rapid change in recent years. This is largely attributable to two factors: the Extractive Industries Transparency Initiative (EITI) and the shift away from secretly negotiated agreements (arranged with individual companies) towards standardized licensing and/or the public disclosure of negotiated agreements. In today's interconnected world, even if a nation and company desire to keep a negotiated agreement confidential, it may be leaked, and once available on the internet, it is difficult to then control its unlimited dissemination. Specialized 'agreement websites' make it possible for the public to access a wide range of mining agreements.⁶

The EITI is a relatively new initiative that can trace its political origins to 2002 when the United Kingdom's Prime Minister Tony Blair released a speech that called on companies and governments to publically disclose their fiscal payments and receipts. The following year, a Statement of Principles to increase the transparency of payments and revenues in the extractive sector was prepared and then agreed by over 40 institutions. In 2004, under the auspices of the IMF and the

⁶ For example, visit <http://www.resourcecontracts.org/>, <http://www.atns.net.au/> and http://repository.openoil.net/wiki/Main_Page to access a wide variety of mining and petroleum agreements.

World Bank, a World-Bank-administered Multi-Donor Trust Fund (MDTF) was created to lend technical assistance to governments that wished to promote extractive sector fiscal transparency policies. Over time, the 2003 principles laid the groundwork for an international standard of reporting: governments report on the various taxes they receive from the mineral industry and companies report the amounts that they pay to government; the amounts paid and received are then subject to reconciliation, and the results are normally made public. A nation's EITI process is periodically assessed to determine whether it is in compliance with the standards or not. As of 2016, over 50 nations, including many mineral-led economies, were attempting to implement EITI, of which about 60 per cent were largely compliant with the standards.⁷ Being a fairly new initiative, it remains to be seen whether the EITI will prove effective in stemming corrupt practices over the longer term, but the disclosure of fiscal payments and receipts required by the EITI promotes accountability and is certain to make fiscally-related corrupt practices more difficult to implement.⁸

1.7 Revenue stabilization funds

Mineral commodity prices are prone to large fluctuations attributable to many factors but such changes are most often related to global business cycles affecting the mineral supply and demand balance. Nations whose annual budgeting is dependent on mining revenues are vulnerable to rapid increases and decreases in commodity prices. It can be a challenge to match annual expenditure to annual fiscal receipts, particularly where a large part of the budget is relatively inelastic, such as in the payment of government workers, the provision of essential health, education, and security services, debt servicing, and so forth.

One approach used to deal with revenue instability is to implement a revenue stabilization scheme whereby 'excess' revenues received during times of high prices are saved and then expended when revenues drop. Such schemes have been implemented by a number of nations and they can effectively help to smooth the revenues available for the budgeting process.⁹ However, such schemes are vulnerable to political risk—a system adopted by one generation of lawmakers may be quickly repealed by the next generation of lawmakers who may want to dissolve the fund to spend the saved funds immediately (perhaps to fulfil election promises or to service debt). For example, Papua New Guinea implemented a mineral revenue stabilization fund scheme commencing in 1974 that worked well for several decades before its implementing act was repealed in 1999 by a new generation of lawmakers.¹⁰

1.8 Sovereign wealth funds

A sovereign wealth is a state-owned fund or entity that usually receives its capital infusion partially from fiscal revenues and partially from its earnings on investments. Such funds are becoming

⁷ A history of EITI, a listing of nations that are implementing it and a copy of the Standards are available at <https://eiti.org/eiti/history>

⁸ For an introduction to transparency issues see *Emerging Economies: Transparency and Accountability in the Extractive Industries Working Paper Series* published by the Natural Resources Governance Institute available at <http://www.resourcegovernance.org/analysis-tools/publications/emerging-economies-transparency-and-accountability-extractive-industries>

⁹ For an example, Chile maintains an Economic and Social Stabilization Fund whose primary purpose is to partially cover cyclical reductions in fiscal revenues. A description of the fund is available at <http://www.hacienda.cl/english/sovereign-wealth-funds/economic-and-social-stabilization-fund.html>

¹⁰ For a discussion of the fund and an accounting of its inflows and outflows see Otto and Dorian (1989) and Lum et al. (1995).

increasingly common and over 70 funds now exist or are in the planning stage.¹¹ For natural resource-led economies, such funds have at least four main purposes—to provide revenue smoothing (such as when used in part as a revenue stabilization fund), to provide for future sustainable income, to diversify income, and to limit available government expenditure based on the absorptive capacity of the economy. Key issues for policymakers when setting up such a fund include: who controls or manages the fund, the type of investments that can be made by the fund, and how and when earnings on those investments will be disbursed and to whom.¹² Many sovereign wealth funds are set up so that annual disbursements to the government or its designated recipients are capped in some way in order to preserve the fund’s capital base. Like revenue stabilization funds, sovereign wealth funds are vulnerable to political action by lawmakers and governments who may over time seek to redirect a fund’s earnings and distributions. While some sovereign wealth funds operate with a goal of public transparency, others are highly secretive and may be subject to potential abuse and corrupt practices. In an attempt to promote transparency, good governance, and accountability standards, several dozen sovereign wealth funds have jointly developed a voluntary code of principles, the ‘Generally Accepted Principles and Practices’, also known as the ‘Santiago Principles’. However, an analysis by Behrendt (2010) concludes that adherence to the principles is generally falling short.

Bauer (2014) and Ang (2010) have documented that many sovereign wealth funds are successful in meeting their objectives but others are not. For example, the Nauru Phosphate Royalties Trust was a sovereign wealth fund set up by the Republic of Nauru, funded through revenues derived from phosphate mining.¹³ At its peak the trust was worth more than one billion Australian dollars, which were to be used for the future benefit of Nauru’s population of around 10,000 people. Abusive spending and mismanagement of the fund by officials eventually led to its bankruptcy and it was dissolved in 2014.¹⁴

Ang (2010) has proposed that for sovereign wealth funds to work well they must meet four critical benchmarks: legitimacy, intent, performance, and endurance. Bauer (2014) recommends six steps that promote good sovereign wealth fund governance:

- Set clear fund objective(s) (e.g., saving for future generations, stabilizing the budget, and earmarking natural resource revenue for development priorities).
- Establish fiscal rules—for deposit and withdrawal—that align with the objective(s).
- Establish investment rules (e.g., a maximum of 20 percent can be invested in equities) that align with the objective(s).
- Clarify a division of responsibilities between the ultimate authority over the fund, the fund manager, the day-to-day operational manager, and the different offices within the operational manager, and set and enforce ethical and conflict of interest standards.
- Require regular and extensive disclosures of key information (e.g., a list of specific investments, and names of fund managers) and audits.

¹¹ A listing of sovereign wealth funds and a brief description of their main attributes are available at <http://www.swfinstitute.org/sovereign-wealth-fund-rankings/>

¹² An analysis of the issues involved in setting up a sovereign wealth fund within the context of a non-renewable resource led developing economy (Papua New Guinea) is available at <http://www.treasury.gov.pg/html/misc/Sovereign%20Wealth%20Fund%20Discussion%20Paper.pdf>

¹³ Nauru Phosphate Royalties Trust Act 1968.

¹⁴ RONWAN Finalisation Act 2014 (No. 19 of 2014).

- Establish strong independent oversight bodies to monitor fund behaviour and enforce the rules.

Unfortunately, while some sovereign wealth funds meet the Ang benchmarks and the Bauer recommended steps criteria, many do not.

1.9 Double taxation treaties

Many nations have entered into ‘double taxation treaties’ in order to promote investment. Such bilateral conventions between two countries seek to eliminate the double taxation of income arising in one country and being paid to residents of another country. Otto and Cordes (2002: 6–17) have observed that the content of such treaties varies widely but that they usually contain a number of investment-related incentives useful to the mining industry such as: reduced dividend withholding tax; reduced interest withholding tax; crediting of income taxes paid by a home country taxable entity in the host country; and the recognition of deductions allowed in the host country as a valid deduction for host country crediting. Of particular importance to foreign-owned mines are treaty provisions that reduce withholding tax rates below the normal statutory rate. Withholding taxes are often one of the largest fiscal costs incurred by a mine and treaty rates are often set substantially below the statutory rate. Many double taxation treaties have been deposited with the United Nations Secretary General and are available at its online United Nations Treaty Series collection website.¹⁵

2 Direct Taxes

In this section, the most common taxes applied to mining are briefly introduced. The term ‘taxes’ is used in a broad sense and includes all types of imposts required to be paid by a taxpayer to the government. Of the taxes discussed in this section, for a typical mine in a typical tax jurisdiction, the largest tax burdens are usually income tax, withholding taxes and royalties, not necessarily in this order. Governments may impose other taxes that mines pay that are not described in this section, such as taxes linked to employee benefits and payroll.

2.1 Income tax

Income tax is generally computed as a per cent of taxable income. In most nations, but not all (for example, in Ghana the general corporate income tax rate is 25 per cent but mines are assessed at 35 per cent), the income tax rate applied to mining income is the same as the rate for other types of income-producing ventures at the same taxable income level. However, most nations accord the mining sector special treatment by the way in which various deductions, allowances, credits, and so forth are used to calculate the ‘tax basis’. These adjustments to the tax basis are described in the section of this paper titled ‘Tax incentives and income tax adjustments’.

From a government perspective, income tax is an unstable source of revenue that will not produce appreciable revenue in a mining project’s early years, when prices are too low or when large capital expenditures occur (such as a mine expansion or upgrade) or are being written down. From an investor perspective, income tax is preferable to other forms of taxation that are not based on the taxpayer’s ‘ability to pay’ (such as royalty, import duties, VAT, and so forth).

¹⁵ To access the United Nations Treaty, see <https://treaties.un.org>

2.2 Withholding taxes

There are several principal types of withholding taxes. One type is where a portion of a remittance is withheld as a prepayment of a tax, such as where an employer is required to withhold a portion of an employee's salary as a prepayment towards that employee's personal income tax liability. Another type relates to foreign transactions where the beneficiary party will not be directly subject to the nation's income tax. In such instances, such as in the services provided by a foreign vendor, the government may impose a requirement on the purchaser of those services to pay a withholding tax based on a per cent of the value of those services. Many mines utilize the services of specialized foreign suppliers for a wide range of purposes including for example: exploration specimen analysis, the preparation of project feasibility and other studies, mine design, mine construction, mine operation, and so forth. A third type is where a foreign lender extends a loan and the government imposes a withholding tax on the interest paid by the borrower. It is also common for governments to assess a withholding tax on dividends and other forms of profit distributions to foreign entities.

Usually withholding tax rates are set at a rate lower than the income tax rate. This is because the withholding tax basis is the gross value of the transaction while the income tax basis is taxable income (gross revenues minus various deductions, credits, and adjustments). Typically, withholding tax rates are about half of income tax rates. It is uncommon for the mining sector to be treated differently than other sectors with regard to the various types of withholding taxes.

2.3 Royalties

Otto et al. (2006: 1)¹⁶ describe a royalty as 'a tax that is unique to the natural resources sector and one that has manifested itself in a wide variety of forms, sometimes based on profitability but more commonly based on the quantity of material produced or its value'. The most common types of royalty are unit-based (a set fee per unit volume or weight of the mineral) or value-based (a per cent of the value of the minerals). Almost all nations that produce minerals assess a royalty on miners. The recipient of the royalty is most often the owner of the mineral, be it the state or a private party. In some nations, royalty is regarded as a form of ownership transfer tax (a transfer of mineral ownership from the owner to the miner) and in others as a fee paid for the right to mine the mineral. In most cases, the royalty is allowed as a deduction when computing taxable income for the purposes of income tax, but that is not always the case (for example, Zimbabwe does not allow the deduction of royalty). From a mineral owner's perspective, royalties are a certain form of income that must be paid regardless of whether a mine is profitable. Most investors dislike royalties because most forms are payable regardless of the mine's ability to pay: they prefer some form of income/profits-related tax. From an economic point of view, some forms of the royalty are also arguably inefficient. This is because they can extract the same revenue from high-cost mines as from low-cost mines and thereby undermine the viability of the former. For example, older copper mines in the Zambian copper belt have higher operating costs than newer mines but are subject to the same royalty rates.

2.4 Value-added taxes/sales tax

Many nations impose either a sales tax or a VAT on the procurement of goods and services. A sales tax is usually calculated as a per cent of the value of the transaction, while a VAT is a per cent tax on the value of an article that has increased in value at each stage of production. Because mines are very capital intensive and most capital expenditure is incurred before revenue generation

¹⁶ For a detailed analysis of all aspects of royalty see Otto et al. (2006).

commences, many governments provide sales tax/VAT relief to the taxpayer during the period of mine development. Without such relief, many mines would not be commercially justified. Sales tax/VAT relief on inputs varies from country to country and may include one or more of the following approaches: tax exemption on inputs, zero-rating the tax rate, crediting VAT payments against VAT obligations later in the mine's life, or providing a refund of VAT paid. Most nations either zero-rate or exempt mineral export sales from VAT but charge the tax on sales where the mineral will be used within the country. From a government perspective, providing tax relief during the mine development period can be difficult to administer, but from an investor's perspective, such relief may be essential because early costs have a large impact on quantitative measures used to evaluate prospective investments (such as net present value and internal rate of return criteria). Most investors prefer exemption or zero-rating rather than a refund scheme because of the otherwise immediate drain on cash flow, and the reluctance of some governments to pay refunds in a timely manner. The payment of refunds can be a particularly vexing challenge during periods of commodity price downturns when national treasuries may be experiencing revenue shortfalls.

2.5 Customs duties

Customs duties are usually calculated as a per cent of the value of a good imported or exported. In addition to raising revenue, import duty has the effect of raising the price of a good intended for sale, thus providing national producers of that good with a competitive advantage over importers. However, much mine equipment is highly specialized and is not amenable to local production. Additionally, mine economics are highly sensitive to costs incurred before sales commence. For these and other reasons, many nations either zero-rate customs duty rates on mine-related equipment or exempt such imports from duty, at least during the mine development phase. Alternatively, some countries require the duty to be paid, but add that amount to the value of the good for recovery through later depreciation. Most nations do not impose export duty on minerals because so doing would lessen the ability of producers to compete in global markets.

2.6 Taxes based on area

Many governments impose at least a nominal tax (land rent, land use fee etc.) on the holder of an exploration or mining authorization that is based on a set amount per unit area. Besides raising revenue, such a tax imposes a cost that acts to discourage speculators who might seek an exploration authorization only for the purpose of on-selling it to another party. Often, the fixed amount payable per unit area is less during exploration than during mining. For exploration authorisations, some governments escalate the amount payable per unit area annually to encourage the authorisation holder to relinquish less prospective ground sooner rather than later. From a government perspective, a tax based on area is easy to implement and administer and provides a steady and predictable cash flow. Exploration companies dislike area-based taxes because the money spent paying them decreases the budget available for exploration work. Taxes based on area are usually imposed in a nation's mining act.¹⁷

2.7 Provincial and local taxes

The degree to which taxing authority is devolved among various levels of governments is usually set out in the national constitution and in the various organic laws of the nation. Most mines are

¹⁷ The World Bank Group sponsored African Mining Legislation Atlas, which provides access to all the principle mining laws of African nations. Users can search and compare various topics such as land rent and royalty. It is available at <http://www.a-mla.org/>

subject to a variety of taxes and fees levied by different levels of government. Typically, the largest tax cost is at the national level with lesser amounts being paid to subnational governments. Table 1 indicates the author's assessment of whether a certain type of tax is amenable to being assessed at the national, provincial or local level.

Table 1. Fiscal methods and their amenability to fiscal decentralization

Tax type	National Govt.	Provincial Govt.	Local Govt.
Income or profits-based tax	Y	P	N
Import duty	Y	N	N
Export duty	Y	N	N
Royalty (profit-based type)	Y	P	N
Royalty (ad valorem type)	Y	Y	P
Royalty tax (unit type)	Y	Y	Y
Royalty tax collected nationally and % distributed	Y	Y	Y
Licensing fees	Y	Y	Y
Surface rental or land use fees	Y	Y	Y
Withholding taxes on loan interest, dividends, services	Y	N	N
VAT on goods and services	Y	P	N
Sales and excise tax	Y	P	P
Stamp duty	Y	Y	Y
Property tax (on book or assessed value)	Y	Y	Y
Payroll-based taxes	Y	P	N
Surtaxes	Y	Y	Y
User fees	Y	Y	Y

Y = Yes, well suited; P = possibly suited; N = not a good fit

Source: Otto (2001).

In a previous study by this author (Otto 2001), an analysis of the mining fiscal systems in over 20 nations indicated that mining sector taxation in developing economies was highly centralized at the national level. Today, in the author's experience, that remains the same. Nations with a federal system of government such as Australia, Brazil, Canada, and the United States, were more likely to devolve significant taxation power to provincial governments, most often through a jurisdictional income tax, royalty, and sales tax. The study revealed that few governments devolve significant taxing power to local government, except occasionally a tax on the value of commercial property. The World Bank Group collects and makes available detailed data on fiscal decentralization¹⁸ but unfortunately, mining is not broken out as a separate category for analysis.

While there are often good reasons to consider fiscal decentralization, it is this author's experience that achieving such decentralization is in practice quite difficult. Taxation powers are often inflexible either because of constitutional constraints or because central authorities are reluctant to devolve taxation power to subnational governments. The more common scenario is for national government to maintain taxing authority but to mandate a certain portion of fiscal revenues for distribution to subnational governments. For example, in Peru there was substantial pressure for the central government to share more of the mining fiscal take at the local level and the operations of some mines were affected by acts of civil disobedience. In response, over the course of a decade

¹⁸ Database access is available at <http://www1.worldbank.org/publicsector/decentralization/fiscalindicators.htm>

changes were made to the fiscal laws and now a portion of both royalties and income tax are collected centrally but distributed to subnational governments.¹⁹

2.8 Taxes based on property value

Most nations impose a tax based on the value of a commercial property. In many nations, facilities located at a mine site are exempted from this type of tax but related facilities located off-site, such as an administrative office, would be liable to the tax. In nations where on-site facilities are not exempt (such as in the United States), property value taxes may be one of the largest taxes paid by a mine.²⁰ In some federal jurisdictions, property value tax rates are set by local government.

2.9 Stamp duties/transaction fee

In many nations, a stamp duty or transaction fee is imposed on various types of business transactions. Such taxes may be assessed as a set fee per transaction type (usually nominal) or calculated as a percentage of the value of the transaction as described in the transacting contract. If the tax is based on a percentage of the transaction value, the cost can be substantial for large projects where financing and procurement contracts may reflect transactions valued at millions or, in the aggregate, billions of dollars. In some jurisdictions, a transactional contract does not come into force until the stamp duty/fee has been paid. The term ‘stamp duty’ reflects the historic practice of affixing or placing a stamp to or on the contract or contract registration document.

2.10 Transport-related taxes

Transport-related taxes are often based on the volume of material that passes over a road, is carried on a rail-line or passes through a port. Such a tax is usually considered as a user fee and may be intended, at least in part, to compensate for the costs of maintaining the transport infrastructure. For bulk commodities, such as coal, iron ore, and bauxite, transport taxes can be an appreciable cost.

2.11 Progressive, excess profits and additional profits taxes

Most nations do not impose taxes specifically designed to capture ‘excess profits’. However, when the business cycle pushes mineral commodity prices up, governments may act to impose a special tax to capture some of the perceived increased rent but may repeal the tax when prices descend.²¹ For example, during the price boom that commenced around 2004 Australia, Mongolia, and Zambia imposed new ‘excess profits’ taxes but repealed them at the end of the price cycle boom. Other nations, such as Chile, Peru, and Liberia, imposed new excess profits taxes but have maintained them even as prices have fallen. A well-designed excess profits tax should be self-adjusting to take into account changing profitability. However, the reality is that excess profits taxes are highly vulnerable to political processes linked to the business cycle.

In practice, there are three principal types of taxes designed to capture excess profits: progressive tax; rate-of-return triggered additional profit tax; and profitability ratio triggered additional profit tax.

¹⁹ For a description of the distribution system see Neyra (2011).

²⁰ Examples and estimates of property taxes in a variety of jurisdictions are described by Otto et al. (2000).

²¹ For additional information see Otto (1992A); Otto (1992B); Land (1995); Cordes (1995); Otto and Cordes (2002); Otto et al (2006); Land (2010).

- With a progressive tax, when the magnitude of annual profits (net income) or prices goes up, the tax rate goes up. The rate increase may be tied to a progressive corporate income tax (such as in the United States and Venezuela) or to a royalty where the royalty rate is linked to the commodity price (such as in Mongolia).
- A rate-of-return triggered additional profit tax is favoured by many economists because of its linkage to the concept of economic rents. When a statutorily set rate of return is exceeded, an additional tax is imposed. The idea is not to capture all economic rent, but to instead impose an additional tax when a rate-of-return calculation suggests that there are substantial economic rents. Typically the rate-of-return trigger rate is in the range of 20 to 25 per cent. The rate-of-return-based calculation is based on the statutorily defined cash flow of the mine to date. It is possible for the tax to be triggered in some years, but if the rate of return falls below the trigger rate, the additional profits tax is not paid. Historically, rate-of-return triggered additional profit taxes were considered by many governments as too administratively difficult to calculate, but new accounting and calculation approaches developed by the International Monetary Fund (such as IMF drafted provisions incorporated into the income tax acts of Liberia, Malawi, and other client countries) have addressed this problem.
- Unlike rate-of-return-based taxes, another form of additional profits tax is based not on the cash flow of the mine over time, but instead on the ratio of profits to costs in the current tax year. If the ratio exceeds a limit, the additional profits tax is triggered and it is applied to either gross sales revenues (a form of royalty) or to a statutorily defined operating income. In Chile and Peru, which impose this latter type of tax, the effective rate of the additional tax is progressive—as the profit ratio increases, the effective additional profits tax rate increases.

In this author's opinion, rate-of-return and additional profits taxes can be a good option for some governments, provided that they have adequately trained tax officials. Any sort of tax whose calculation takes into account costs is more difficult to implement, monitor and enforce than one that is solely based on revenues (such as an ad valorem type royalty). The introduction of these types of complex taxes is best suited to nations with a strong, well-funded and educated tax authority.

3 Indirect taxes

In addition to taxes that result in a direct monetary payment to government, governments can impose requirements on miners that result in higher costs. Several examples of indirect taxation are introduced below.

3.1 State participation

Some nations require that the state be an equity interest participant in a mining project and the means by which such an interest is created varies.²² Daniel (1995: 175) describes state equity as 'the acquisition by the government (or a state-owned enterprise) on behalf of the state of a participating interest or a claim on after-tax profits in a joint venture with privately-owned companies'. Most equity interests provided to governments fall into one of the following categories:

²² For a more complete treatment see McPherson (2010), Otto and Cordes (2002) and Radetzki (1985).

- Free equity. This term means that the state receives an ownership interest at no cost to itself. The ownership interest does not oblige the state to participate in the paying of any costs associated with the project. It does, however, entitle the state to a share of distributed dividends or profits. Free equity will have a large impact on an investor's profits, and a requirement for free equity is considered a major detriment by most potential investors. The rationale usually offered for such a requirement is that the state's contribution to the project is the mineral endowment being exploited. Free equity interest requirements have waned over the past several decades, except in the West Africa region. This is probably attributable to the realization by governments that free equity requirements had a substantial negative impact on potential fiscal revenue because little investment was occurring. Even in the West Africa region where many nations have a 10 per cent free equity requirement in their mining code (perhaps stemming from the political necessity to demonstrate government control after a long period of colonial exploitation), proposed mining projects can sometimes be exempted from the equity requirement (such as in Ghana and Guinea).
- Working equity. This type of equity is sometimes referred to as 'participating equity'. The equity interest is purchased by the state according to an agreed or statutorily defined pricing scheme. After purchasing its interest, the state must contribute to the expenditure needs of the project in proportion to its shareholding. Most investors do not view this requirement as a major investment impediment as long as the purchasing procedures are clearly defined. Some investors welcome working equity participation because it can reduce certain types of risk. The mining laws of Botswana, Indonesia, and Papua New Guinea laws require that the government has an option to acquire a working interest in new mines, and these nations have been successful in attracting foreign investment into their mining sector.
- Carried interest equity. This is a specialized form of working equity and has all the attributes of working equity described above, except for the way in which the ownership interest is paid for. Instead of a cash-based transaction, the state's share is paid for from the future dividends or profit distributions that would have been distributed to that ownership interest. The amount due to the investor from the state accrues interest. The result is that for many mines, the state will not receive any dividend distribution for many years, if ever. In practice, the amount due to the investor may increase steadily over the years. In effect, but not in form, this type of equity can be thought of as similar to a loan extended by the investor to pay the state's equity purchase cost and ongoing participation costs. Carried interest requirements are typically not required by statutory mandate, but arise instead in a negotiated agreement where a government desires an equity stake but is not able to currently pay for it. For example, the Government of Mongolia entered into an agreement with foreign investors to develop a large copper mine, and a related shareholder's agreement provided the carried interest equity provisions.²³
- Free carried interest equity. This type of equity is a special form of carried interest equity but with the important difference that interest does not accrue on the amount payable to the investor by the state. In effect, this is a form of interest-free loan.

If the private party investor is required to provide free equity or free carried interest equity, many investors would view this as a form of indirect taxation.

²³ The agreement between the State, Rio Tinto and other parties is available at <http://www.resourcecontracts.org/contract/ocds-591adf-MN2079301876RC-1658/view>

3.2 Requirements to source employees, goods, and services locally

Mines have the potential to operate as economic enclaves with few linkages to the local or national economy. Governments may seek to maximize mining sector economic multiplier effects by requiring the mine operator to source, to the extent practical, employees, goods, and services from within the nation. Many investors would consider this a form of indirect taxation to the extent that such a requirement imposes additional costs on the operator. This topic is the subject of Östensson (2017, forthcoming).

3.3 Development requirements

Mines have the potential to aid in the development of the localities in which they are situated. Large mines require significant supporting infrastructure and some governments seek to leverage their development in such a way so as to provide services to the surrounding area. Likewise, public access to mine-built rail, roads, transmission lines, airports, and ports may be required.

Mines exploit non-renewable resources and over time each will close when its reserves become depleted. Some governments, recognizing the fleeting nature of mining, require that larger mines assist in the sustainable development of surrounding communities. There is a growing interest in the use of community development agreements as a means of fostering local sustainable development. While some community development agreements are voluntary, an increasing number of nations are making them mandatory and require miners to implement community development plans. Model community development agreement regulations published by the World Bank (Otto 2010) include a requirement to annually expend on community development an amount no less than a fixed percentage of the gross minerals sales revenue earned in the prior year. This topic is discussed much more fully in another working paper (Otto 2017, forthcoming) by the same author.

Such requirements may impose costs on an operation in excess of the amount that the mine might otherwise budget to meet its internally generated corporate social responsibility objectives. If this is the case, most investors would perceive these additional costs to be a form of indirect taxation.

3.4 Foreign exchange requirements

Governments sometimes act to control the rate at which the national currency is transferable into foreign currencies. This can act to lower profit levels by inducing foreign exchange losses and increasing transaction costs. Additionally, some nations require that mineral sales revenues for exported minerals be remitted back to the country and sometimes require that they be converted to the national currency or subject them to foreign exchange rationing requirements. For example, Zimbabwe requires that all mineral sales revenues be passed through the Minerals Marketing Corporation of Zimbabwe (a state enterprise set up by statute) and from time to time has restricted or barred companies from repatriating such revenues out of the country.²⁴

4 Tax incentives and income tax adjustments

Governments that seek to attract foreign-sourced mineral sector investment sometimes provide special provisions within their tax legislation or in negotiated agreements. Otto (1992A, 2000) has

²⁴ Minerals Marketing Corporation of Zimbabwe Act [Chapter 21:04].

identified ten particular tax incentives that some nations offer to mineral sector investors. Based on the author's experience, these tax incentives are still in use today. These are briefly described below. It should be noted that the generosity of nations offering tax incentives to potential investors tends to vary with the business cycle. With the advent of the so-called 'super-cycle' that commenced around 2002 and resulted in mineral commodity price increases and an abundance of exploration and mine development funding, some nations pulled back on incentives and many raised taxes. With the subsequent fall-back in prices, it can be expected that the usage of tax incentives will be one tool used by governments to compete for scarce capital. It is interesting to note that a tax study conducted by the International Council on Mining and Metals (ICMM 2009) concluded that many companies consider tax incentives as less important than tax disincentives, such as high rates.

4.1 Tax holiday

A tax holiday is a period of time during which a mine is exempt from the payment of one or more types of taxes such as income tax, import duty or VAT. Many tax holidays are time limited, typically for a period of five years or less, or are tied to the project's capital recovery period. The popularity of income tax holidays has diminished over time as governments have come to realize that they are largely ineffective—capital-intensive mines usually already have sufficient offsetting deductions (depreciation, interest payments etc.) in their early years to negate the obligation to pay income tax. For mines exploiting smaller deposits, an income tax holiday can provide miners with access to high-grade ore extraction with an incentive to mine the maximum value possible during the tax holiday. While most nations no longer offer tax holidays, some do. Indonesia for example has recently introduced an income tax holiday for large mining projects.

4.2 Loss carry-forward

Most governments allow income tax payers the ability to carry forward losses from a loss-making year to offset income earned in future years. This is a valuable incentive for the mining industry where wide price fluctuations are the norm. While some nations allow the unlimited carry-forward of losses, others place a limit on carry-forward (typically around five years). Some nations, such as the United States, also allow the carry-back of losses, but many developing countries do not.

4.3 Allowable expenses

For income tax purposes, accountants distinguish between two main categories of costs: those that can be expensed in the year that they are incurred and those that are capitalized for future depreciation/amortization. In nations that allow loss carry-forward, investors prefer the ability to expense rather than to depreciate a cost because the tax deduction occurs earlier in time. Many firms are sensitive to the time value of money and being able to deduct costs earlier means that the payback period is reduced and measures of profit, such as internal rate of return, are increased.

Many nations provide for special treatment of exploration costs. Most exploration costs will be incurred before any mine revenue is generated. Recognizing this fact, for tax purposes many governments provide for exploration costs to accumulate and then allow the costs to be expensed (or to commence amortization) when the mine begins commercial sales.

A controversial issue is how costs associated with social expenditure (such as community development) should be treated. Some nations do not allow such costs to be expensed or capitalized as a normal cost of mining. However, they may allow such costs to be deducted as a charitable donation, subject to meeting charitable donation tax requirements. If social development expenditure is required by law, rather than being a voluntary expenditure provided

as part of a firm's corporate social responsibility programme, there is a greater likelihood that the tax authority will recognize the cost as an allowable deduction.

4.4 Capitalized cost deductions

Most income tax laws provide that expenditure on various types of capital and intangible goods may qualify for deduction from taxable income over a period of years (i.e. typically depreciation for tangible goods and amortization for intangible goods). Historically, the period over which the costs are deducted were tied to the expected life of the good. To attract investment, many mineral-led economies allow for the accelerated depreciation of capital goods purchased for the purposes of a mine. Accelerated depreciation refers to the taxpayer being allowed to deduct the costs over a shorter period than otherwise allowed. Mining firms generally prefer to take larger deductions early in the mine's life because the real value of the deductions may decline due to inflation. The effect of allowing accelerated depreciation/amortization is to shift tax receipts from the project's early years to later years.

4.5 Loan interest deductions

Most income tax acts allow for the deduction of loan interest payments for the purpose of computing income tax. Many mines are heavily debt financed and how a nation approaches loan interest deductions can play important role in investment and finance decision making. Some governments prefer to see mines developed using at least some capital not originating from lenders and they accomplish this by capping the allowable debt-equity ratio for loan interest deduction purposes.

4.6 Depletion allowance

A depletion allowance is a rare form of income tax deduction. It is most often allowed in nations where minerals are owned by individuals rather than the state (for example, for some types of minerals in the United States). The rationale behind a depletion allowance is that a mineral deposit is a depleting asset that should qualify for depreciation, and the depletion deduction savings can be used to explore for a new ore body. Nations where minerals are owned by the state rarely offer a depletion allowance. A depletion allowance is somewhat analogous to a reverse royalty—an indirect payment to the miner to deplete the nation's non-renewable resources. For nations that provide depletion allowance the calculation may be based on a fixed percentage of qualifying costs each year or calculated based on the rate at which the ore body is actually used up.

4.7 Tax credits

Governments that are interested in promoting a particular type of qualifying activity, such as research, may allow related costs to be credited against a taxpayer's income tax liability instead of being deducted for calculating income tax. For example, Canada provides a Scientific Research and Experimental Development Credit. A tax credit is more valued by a taxpayer than a tax deduction and is thus a more effective incentive. The difference in income tax between a tax deduction and a tax credit is illustrated in Table 2, assuming that income is 1,000 and the cost of a qualifying activity is 100.

Table 2. Income tax comparison: tax deduction versus tax credit

	Income tax calculation	
	Assuming a tax deduction	Assuming a tax credit
Income	1000	1000
- Deduction	<u>- 100</u>	<u>- 0</u>
Taxable income	900	1000
x Income tax rate	<u>x 0.2</u>	<u>x 0.2</u>
Income tax before credit	180	200
- Tax credit	- 0	- 100
Income tax payable	180	100

Source: author's calculation.

4.8 Reinvestment tax credits

Mining is a global business and a firm that earns mining revenues in one country may decide to invest those revenues in another country. In order to promote the retention of investment capital in the country, a government has several options. One approach is to penalize transfers of capital out of the country using some form of tax on remittances (such as a dividend withholding tax). Another approach is to entice the investor to reinvest its capital in the country (or the taxed project) by providing a reinvestment tax credit. In its simplest form, a reinvestment tax credit is a dollar for dollar offset for each dollar that is spent on qualifying investment against a dollar owed in income tax. Governments that provide reinvestment tax credits to mines, like China, Ghana, Mongolia, and Peru, most likely have decided that a decrease in immediate revenues will be more than offset by the tax potential created by new investment.

4.9 Tax stabilization

Large mines can require enormous initial investment. Because the resource on which they depend is location specific, that capital is immobile, and the captive investment is subject to the risk that once the mine is built, the taxation system may be amended to the investor's disadvantage. Investors and their lenders may thus require an assurance that the fiscal system will remain stable, at least for a certain period for time, before they will invest. In a major mining tax study, ICCM (2009) reported that the two most important tax issues for mining companies are stability and predictability. Governments with a history of political or fiscal system instability may find it necessary or useful to provide the stabilization of one or more taxes in order to meet investor needs. There are two principle ways that governments approach fiscal stabilization: by terms negotiated in an agreement with the state²⁵ and by provisions set out in a law. The former approach allows flexibility on a project-by-project basis while the legislated approach provides for standardization. Fiscal policy makers, whether negotiating an agreement or drafting a law, have several key issues to address: Which taxes are to be stabilized? Is just the tax rate stabilized or is the tax basis also stabilized? For what time period is stabilization allowed? Can the state impose new taxes on a project once it is built?

Governments that provide tax stabilization have increased administrative challenges. Each mine that operates under a stabilization scheme becomes an exception to the existing fiscal system when that system evolves. Over time, many separate 'tax systems' may result as mines are granted tax stabilization at different points in time. The administration of many mines, each operating under a different stabilized regime, is a challenge for governments. As an example, in discussions with a tax authority in a South American nation that allows tax stabilization, the author was told that over

²⁵ For a description of tax stabilization provided in mining and petroleum agreements see Daniel and Sunley (2010).

50 different taxing schemes had resulted for mines in that nation. In this author's experience, standardized limited-term tax stabilization, such as the non-negotiated optional schemes set forth in the tax laws of Chile and Peru, can be a valuable tool to attract investors, but should be restricted to very large projects in order to avoid the administrative challenge.

5 Transfer pricing and other tax minimization schemes

There are many ways in which taxpayers can reduce their tax burden, either legally or otherwise. Most tax minimization schemes are linked to either increasing reported costs (input manipulation) or reducing reported revenues (output manipulation). Often, the goal is to transfer a portion of taxable income from the host nation in which the mine is located to a low or zero income tax rate jurisdiction.

An example of input manipulation is when a foreign investor sets up a company in a no or low tax nation (i.e. a tax haven) and that company then provides management, marketing or other services and/or loans to the company in the host nation at a cost higher than what might have been charged had the two firms not been affiliated. The effect is to increase tax deductions in the host nation, thus lowering taxable income. For services, it is difficult if not impossible for a tax authority to determine whether input costs are artificially inflated. For loans, the task is somewhat simpler but is still difficult to identify. For this reason, some nations have developed loan interest deduction limits based on thin capitalization rules²⁶ and a cap based on a percentage of earnings before income tax (for example, in Germany and Norway). If the cap is breached, a portion of loan interest may be non-deductible or treated as a dividend. In this author's experience, tax minimization schemes based on input cost manipulation are commonplace.

The output manipulation of revenues has long been a problem for tax authorities. A simple practice is for the producing company to sell its output to an affiliated company located in a no or low tax jurisdiction, reducing its gross revenues in the host nation and thus reducing the amount of income tax and royalty. The affiliated company in the low tax nation then on-sells the output at the full market price. Some nations still lack basic provisions in their mining and tax laws to control output price manipulation. In mining laws recently drafted with the help of this author, sections to assist tax authorities have been added, such as: a requirement that all sales must be on an arms-length basis; all sales to an affiliate must be reported; all sales are subject to royalty revision if the authority determines that the sale was not on an arms-length basis; penalties apply in case of a violation; and repeated violations can result in the mining concession being cancelled. Even with adequate legal provisions, detecting transfer pricing can be a major challenge because determining whether a fair price has been paid is a challenge. For many commodities a reliable reference price is not available. For example, many metals are sold in the form of a multi-metal concentrate (such as one containing lead, zinc, and silver) that contains varying levels of deleterious substances (such as sulphur and arsenic). There are market reference prices for refined lead, zinc, and silver but not for concentrates. Tax authorities often lack access to information (for example, sales contracts from across the globe) that would allow them to determine a fair price for such concentrates. An additional challenge is that each sale for delivery may be different because the mineral being mined may be non-homogenous—the coal from one part of a mine may have a different heating value than the coal from another part of the mine and thus a different value.

²⁶ For an in-depth analysis of thin capitalization rules see Blouin et al. (2014).

Most developing nation tax authorities are ill equipped to effectively deal with transfer pricing schemes and even well-trained tax authorities in developed nations struggle.²⁷ International ‘standards’ such as the OECD Transfer Pricing Guidelines for Multinational Enterprises²⁸, in this author’s opinion, have been ineffectual as applied to the mineral sector.

Worldwide, governments continue to work on improving legislation to control transfer pricing and other tax minimization practices. For example, it is fairly simple to amend a mining law to require that any mineral sales or any service type contract with an affiliate be reported to government along with a copy of any associated invoice or contract. Arms-length pricing requirements are suitable for both a mining law and the tax act and thin capitalization rules are appropriate for the tax act.

Transfer pricing is a major problem for governments, and a particularly vexing challenge for mineral-led economies. Kar and Spanjers (2015)²⁹ estimate that developing and emerging economies lost US\$7.8 trillion from illicit financial flows from 2004 through to 2013, of which about 83 percent was attributed to the fraudulent invoicing of trade. In order to curb transfer pricing they recommend a number of actions by governments, including:

- **Beneficial Ownership:** Governments should establish public registries of verified beneficial ownership information on all legal entities, and all banks should know the true beneficial owner(s) of any account opened in their financial institution.
- **Anti-Money Laundering:** Government authorities should adopt anti-money-laundering legislation and strongly enforce it.
- **Country-by-Country Reporting:** Policymakers should require multinational companies to publicly disclose their revenues, profits, losses, sales, taxes paid, subsidiaries, and staff levels on a country-by-country basis.
- **Tax Information Exchange:** All countries should actively participate in the worldwide movement towards the automatic exchange of tax information as endorsed by the OECD and the G20.
- **Trade Misinvoicing:** Customs agencies should treat trade transactions involving a tax haven with the highest level of scrutiny. Governments should significantly boost their customs enforcement by equipping and training officers to better detect intentional misinvoicing of trade transactions, particularly through access to real-time world market pricing information at a detailed commodity level.
- **Sustainable Development:** The indicator for the UN sustainable development goal 16.4 should be country-level estimates of illicit outflows related to transfer pricing and other sources based on currently available data (ix).

²⁷ The World Bank Group has published a mineral sector transfer pricing reference guide for use by tax authorities. See Guj et al. (2017).

²⁸ OECD (2010). *Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations*. Available at http://www.ilsole24ore.com/pdf2010/SoleOnline5/_Oggetti_Correlati/Documenti/Norme%20e%20Tributi/2011/02/istruzioni-uso-societa-perdite-fiscali/ocse-linee-guida-2010-prezzi-trasferimento.pdf Paris: OECD Publishing.

²⁹ For estimates of capital flight from Sub-Saharan Africa see Ndikumana and Boyce (2008).

6 Conclusion

The taxation of the mining industry varies considerably from nation to nation and evolves over time, reflecting the response of politicians and tax authorities to a variety of factors including commodity price cycles, levels of investor interest and changing national objectives. Today, governments have access to tools and expertise that can assist them in fiscal reform efforts, including software that can allow the holistic testing of tax scenarios on project economics. While the types of taxes and investment incentives have remained fairly static for the past several decades, annual profit-ratio-based additional profits taxes newly introduced by Chile and Peru may be of interest to some nations—particularly nations with a strong, well-funded and educated tax authority. Historically, some nations sought mineral-sector-derived revenues from both taxation and through direct participation by the state in mining, either through a state mining enterprise or through some sort of joint venture or share participation arrangement. That is less common now, except in the West Africa region, as many nations have concluded that they can achieve the objectives of control and risk-free revenue more effectively through legislation. There has also been a move away from negotiating mining agreement fiscal terms towards a reliance on standardized requirements set out in the general tax laws. In this author's opinion, the time for such agreements has passed, and nations that still use them should concentrate their future efforts on strengthening the underlying system of laws, rather than spending the considerable time and effort it takes to negotiate agreements that are specific to individual companies or projects. However, for very large projects, standardized limited-term tax stabilization, either achieved by a non-negotiable tax stabilization agreement or by statute, can be a useful tool to attract investment and requisite financing. Progress by tax authorities to stem fiscal leakages that result from transfer pricing practices remains slow in both developed and developing nations. While input and output transfer pricing mechanisms are well known, the ability of governments to address these practices has remained weak. In this author's opinion, most nations today have developed their mineral sector tax systems to achieve a 'theoretical' fair balance between national and investor interests, but transfer pricing linkages remain a major challenge that distorts actual revenue collection.

The emphasis of this paper is on how mines are taxed, not on how tax revenues should be distributed and used. However, it is noted that one of the influencing factors that drives fiscal system policy evolution is the issue of whether subnational governments should have additional taxing power or be given special revenue dispensation. It is the author's experience that devolving additional tax power to subnational governments is often not possible because of constitutional constraints or because central authorities wish to maintain control. The more common scenario is for national government to maintain taxing authority but to statutorily mandate a certain portion of fiscal revenues for distribution to subnational governments.

In summary, this working paper has provided an introduction to the various taxation approaches applied by governments to the mining sector and it includes a description of the principal tax types and investment tax incentives. It has briefly described the main policy issues pertaining to mineral sector taxation. Its primary message is that governments, when devising mineral sector fiscal systems, should carefully assess their fiscal options in a holistic, balanced approach that anticipates commodity price cycles, and that mining companies should anticipate fiscal system changes that reflect the evolution of the political economy in which they operate.

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