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ANALYSIS OF TAX REGIMES

COMPARATIVE ANALYSIS OF TAX REGIMES OF LAND-BASED MINING IN
15 COUNTRIES

Report: Final draft
For the **International Seabed Authority**
By **RMG Consulting**

Table of Contents

<i>Acronyms and abbreviations.....</i>	<i>3</i>
<i>1. Preface.....</i>	<i>4</i>
<i>2. Background.....</i>	<i>5</i>
<i>3. Executive summary</i>	<i>7</i>
<i>4. Metals in society – an introduction.....</i>	<i>9</i>
4.1. Common heritage of mankind.....	10
<i>5. The global mining industry.....</i>	<i>12</i>
5.1. Global mining.....	12
5.2. Countries under analysis	13
<i>6. Mineral fiscal regime.....</i>	<i>16</i>
6.1. Mining royalties	17
6.2. Other mineral taxes	26
6.3. Losses and deductions	27
<i>7. Administrative fees</i>	<i>28</i>
7.1. Exploration permit	28
7.2. Mining permit	30
<i>8. Environmental levies</i>	<i>32</i>
<i>9. Corporate income tax.....</i>	<i>33</i>
<i>10. Conclusions.....</i>	<i>36</i>
<i>11. References.....</i>	<i>39</i>

Table of Figures

Figure 1. Value of mineral and metal production at the mine stage by country.	12
Figure 2. Total value at the mine stage by mineral/metal in 2018 (%).	13
Figure 3. Value of production at mine stage for Co, Cu, Mn and Ni (USD billion/% of world) 2018.	13
Figure 4. Value of production by metal (Co, Cu, Mn & Ni) and country 2018 (USD billion). ...	14
Figure 5. Copper royalty rates (average and extremes) per country 2020 (%).	23
Figure 6. Cobalt royalty rates (average and extremes) per country 2020 (%).	23
Figure 7. Manganese royalty rates (average and extremes) per country 2020 (%).	24
Figure 8. Nickel royalty rates (average and extremes) per country 2020 (%).	25

Table of tables

Table 1. Production and share of global production by country and metal (Co, Cu, Mn & Ni) 2018 (kt, Mt & %).	15
Table 2. Royalty rates per metal and country 2020 (%).	22
Table 3. Administrative fees per country 2020.	28
Table 4. Corporate Income Tax rates for mining companies per country 2020 (%).	34

Acronyms and abbreviations

AUD – Australian dollar
BRL – Brazilian real
CAD – Canadian dollar
CIM – Canadian Institute of Mining
CIT – Corporate Income Tax
CLP – Chilean peso
CNY – Chinese yuan
Co – Cobalt
Cu – Copper
DRC – Democratic Republic of the Congo
DSM – deep seabed mining
ECF – environmental compensation fund
GDP – gross domestic product
ICMM – International Council on Mining and Metals
ISA – International Seabed Authority
JMD – Jamaican dollar
JPY – Japanese yen
kt – thousand tonnes
Mn – Manganese
Mt – million tonnes
Ni – Nickel
PGK – Papua New Guinean kina
PHP – Philippine peso
PLN – Polish zloty
PNG – Papua New Guinea
SMB – Special Mining Burden
t – tonnes
USD – United States dollar
UTM – Unidad Tributaria Mensuel (Monthly Tax Unit)
VAT – Value Added Tax
ZAR – South African rand

1. Preface

1. The International Seabed Authority (the Authority) released a call for proposal on 2 March 2020 for a *Comparative Analysis of the Financial Aspects of Seabed Mining and Land-Based Mining*.

2. RMG Consulting provided a proposal and was selected to collect and analyse data on existing fiscal regimes in general and royalty rates for land-based mining in particular of cobalt, copper, manganese and nickel within 15 countries, being broadly representative of the majority of global production of those metals. In tandem CRU Consulting was selected to study an appropriate valuation methodology for polymetallic nodules.

3. The methodology to be used for the data collected and analysis by RMG Consulting were presented in a series of webinars which were organized with the assistance of the secretariat with three groups of stakeholders from the Authority: members of the Council and members of the Authority not represented on the Council, observers to the Authority and contractors with the Authority with a view to providing information on the preparation of the comparative analysis of the financial aspects of seabed mining and land-based mining which has been requested by the Council of the Authority in February 2020. In total well above 100 persons attended the webinars and feedback received from participants in all three webinars have been taken into account for the preparation of this comparative analysis and are incorporated into this report.

4. RMG Consulting are policy and strategy advisors in the global mineral sector. The company grew out of the Stockholm-based Raw Materials Group established in the 1970s. RMG Consulting provide independent advice and analysis to governments, companies, international organizations and civil society. The following report has been researched and written by prof. Magnus Ericsson (project leader), Anton Löf, Olle Östensson and Eva Liedholm Johnsson. The report was conducted as a desktop study supplemented by interviews with relevant authorities and experts where necessary.

5. Data was collected during the month of May 2020. The webinars were held on 8, 11 and 12 June 2020. This report was finalised on 12 October 2020. Data sources and materials are presented in online appendices.

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2. Background

6. The United Nations Convention on the Law of the Sea (the Convention) and the Agreement relating to the Implementation of Part XI of the Convention (1994 Agreement) define the objectives and principles for the financial terms of contracts between the Authority and recognized entities conducting deep seabed mining (DSM). Section 8 of the 1994 Agreement sets out principles that shall form the basis for establishing rules, regulations and procedures for the financial terms of contracts. In particular, the system of payments to the Authority shall be fair both to the contractor and to the Authority. The rates of payments under the system of payments shall be within the range of those prevailing for land-based mining of the same or similar minerals in order to avoid giving deep seabed miners an artificial competitive advantage or imposing on them a competitive disadvantage.

7. The Council of the ISA has established an open-ended informal working group to discuss the financial terms of contracts. To assist the work of that group, the Authority has contracted MIT to explore the implications of alternative financial payment mechanisms on the economics of the ISA, on behalf of mankind, and seabed mining contractors mining polymetallic nodules. MIT has developed a financial model which makes it possible to explore how these alternative payment mechanisms divide funds between the ISA and the contractors.

8. During the first part of the twenty-sixth session in February 2020, the Council considered the report of the Chair of the open-ended informal working group on the outcome of the third meeting of that working group, which was held on 13 and 14 February 2020 (ISBA/26/C/8). The Council requested the secretariat to prepare a comparative study of seabed mining and land-based mining with regard to the policy objective contained in section 8, item (1)(b), of the annex to the 1994 Agreement.¹

9. The scope of work stipulates that the study should focus on the financial aspects and include the identifications of:

- a) Royalty rates;
- b) Taxable base of royalties;
- c) Administrative fees;
- d) Environmental levies; and
- e) Corporate Income Tax (CIT).

¹ The section states that “The rates of payments under the system shall be within the range of those prevailing in respect of land-based mining of the same or similar minerals in order to avoid giving deep seabed miners an artificial competitive advantage or imposing on them a competitive disadvantage;”
https://www.un.org/Depts/los/convention_agreements/texts/unclos/closindxAgree.htm

10. The analysis also attempts to identify the average royalty rate(s) and methodology to determine a taxable base that would neither advantage nor disadvantage the contractors of the Authority in relation to land-based producers.

11. The report should be limited to land-based mining of cobalt, copper, manganese and nickel, the four main elements to be produced by DSM of polymetallic nodules.

12. Countries which have been selected for the comparative analysis were: Australia, Brazil (Minas Gerais), Canada (Ontario), Chile, China, Democratic Republic of the Congo (DRC), Indonesia, Jamaica, Japan, Papua New Guinea (PNG), the Philippines, Peru, Poland, Russian Federation and South Africa. The countries were selected to represent the largest producers of the relevant metals worldwide, States that are members of the Authority as well as States where seabed mining has been considered. In three countries, Australia, Brazil and Canada, royalties and part of the mining taxation regime are not a federal but provincial or state jurisdiction and for these countries Queensland, Minas Gerais and Ontario, respectively, have been studied.

13. The report starts with an introduction to the role metals play in society and how metals contribute to the overall economic development of any country. This is followed by a brief introduction to the global mining industry: the geography of mining and the value per metal is discussed. The chosen countries mining industries are presented with a focus on cobalt, copper, manganese and nickel both in volume and value terms. The purpose is to give an outline of the economic importance of the four metals and mining in these 15 jurisdictions relative to global mining.

14. In the following sections royalties, fees and other mineral taxes are described. Mineral fiscal regimes and the reasoning behind them are discussed. The report puts a particular focus on royalties, including definitions and rates as well as taxable base. In order to include all taxes on the mineral industry for the countries chosen the report goes on to mention other mineral taxes that do not fit the definition of a royalty but are exclusive to the mining industry. Next, administrative fees for exploration and mining permits are discussed as well as environmental levies. The section ends with a description of corporate income tax and a note on deductions and losses supplement the picture.

15. The report concludes with an analysis and discussion of the data presented. The mining tax regime in each of the studied countries is presented in more detail in the following link: <https://isa.org.jm/files/documents/20200921-Annex-Final3.pdf>

3. Executive summary

17. This study of land based mineral fiscal regimes covers a review and an analysis of the regimes in 15 countries. These countries from all regions of the globe account for a majority of world production of all the four metals potentially to be mined from the seabed: cobalt, copper, manganese and nickel. The sample contains industrialised countries and emerging economies at all development levels. For some countries mining's contribution to their economies are essential for others it is an economic activity of less importance.

18. The contribution to mankind of these metals is divided into two major parts: the metal itself which is indestructible and can be recycled infinitely and the mineral rent created when mining and beneficiating the metal. The purpose of the fiscal regime is to capture a suitable part of the mineral rent for the benefit of mankind while allowing the investor to retain a share big enough to create an economic incentive to make an investment.

19. The principal instruments theoretically available to governments to address the general objectives of a fiscal regime for the mining industry are:

- Mining royalties – a percentage of production or gross revenue;
- Income or profit-based taxes – mainly corporate income tax (CIT); and
- Mineral rent tax – taxes that target profits in excess of those generally required to attract investments.

20. As a result of the comparative analysis, for seabed mining a royalty is recommended. A mineral rent tax could be an alternative but as such a tax is not widely employed and hence there are only limited experiences of its use. Corporate income taxes are on a similar level in most countries and should not create an impact in modelling of the seabed mining fiscal regime.

21. Mineral tax regimes are converging and constantly changing to be competitive. It will hence be necessary also for the Authority to be able to adjust and revise the seabed fiscal regime applicable to exploitation in the future in order not to unbalance the competitive situation between land and seabed mining when conditions change.

22. In order to establish the effective tax rate of a mineral tax regime *all* taxes levied on a model mining operation over its entire life from exploration to rehabilitation should be considered in order to obtain a true effective tax rate. This approach is out of the scope for this study, but its detailed review of rates and taxable bases in different countries together with a careful analysis should be sufficient to create a base for a suitable fiscal regime for seabed mining.

23. Royalty rates vary from 2-3 % up to 10-12 % depending on a range of factors from history of mining, political focus in each country to how the taxable base is defined. The royalty system has developed over a long period of time and is relatively easy to administer. Which level of royalties to use and how to define the taxable base for seabed mining can only be established through model calculations which is not part of this study. A simple and transparent ad valorem model with separate levels for each metal is proposed.

24. Administrative fees for exploration and mining permits are commonly levied in the selected 15 jurisdictions in order to cover administrative costs incurred by regulators and to ensure that exploration and mining are done effectively and continuously. At the same time most countries want to ensure that the investor's funds are spent to enlarge the geological knowledge rather than pay relatively limited funds to government. Administrative fees are not a relevant factor in considering a seabed tax regime.

25. Only very few countries use environmental levies, i.e. charges for environmentally harmful emissions, as an instrument for mitigation of potential environmental damage. The common model is to prevent pollution by setting limits to emissions which must be followed at the expense of the miner. In most countries, companies have to set aside funds to guarantee that rehabilitation after closure of project for whatever reason can still be made.

26. In general, corporate income taxes (CIT) levels are set in a relatively narrow band between 20-30 % in most countries. The CIT regime should not be of particular importance when defining a tax regime for seabed mining.

4. Metals in society – an introduction

27. Minerals and metals are, and will remain, the material foundation for all societies. None of the technologies nor the infrastructure societies depend on to function would be possible if metals were not available for use. Thus, metals produced in mines are not only a value creator for the individual mine and the accompanying mining company but is essential for all downstream companies that depend on a specific metal or metals for the creation of its products and contributes to the economic development of the host country.

28. Metals cannot be destroyed; they are elements and can be recycled and reused an infinite number of times. An investment to extract a mineral from the ground, or indeed the seabed, and refining it into a metal is an investment for the future from the point of view of mankind. This is so because the cost, including energy consumption, for recycling metals is lower than for virgin materials out of a mine. However, virgin materials are still very much needed. The global society has not reached the saturation point where it can function on recycled metals only. There is thus a need for virgin materials to build societies and alleviate poverty. Given the increasing metal intensity, when switching to a fossil-fuel-free energy supply, even more metals than previously thought will be needed. A nation's mineral riches are thus likely to remain an important foundation for economic and social development.

29. Today, many emerging economies depend on minerals and metals as important contributors to exports, gross domestic product and government earnings (Ericsson & Löf 2019). Commodity markets are global, and the trade in minerals and metals is growing. Metal- and mineral producing countries are increasingly among the most dynamic emerging economies, while the main markets remain in the industrialized countries and China. The latter is the most important user of minerals and metals, and one of the largest importers, with import volumes still increasing. This means that the value created by metals further downstream, in various industries, often accrue to other countries than where the ore is extracted. It is thus important for mineral producing countries to have a fiscal regime for the mineral sector, which is carefully drafted and easy to operate. The fiscal regime also needs to be balanced to both encourage mining and to make sure that a fair part of the mineral rent² stays within the mineral producing country.

30. Resources and reserves are economical terms to define the amount of minerals within a mine, deposit, company or country that can be extracted for a profit at current metal prices.³ Resources and reserves increase with exploration as new deposits are found

² Mineral rent is defined as the difference between the value of production for a stock of minerals at world prices and their total costs of production according to the World Bank.

³ A deposit is a part of earth's crust where the average percentage of a metal, in a mineral, is higher than that of the average crust. Resources and reserves are the economically extractable parts of a deposit. With increased knowledge, through geological, economic, and engineering and other analyses of the deposit, the classification shifts from resource to reserve. Resources can be divided into inferred, indicated and measured resources while reserves are divided into probable and proven reserves. See for example CIM (2014) for

and defined as resources and reserves. They also grow when metals prices increase as deposits with lower grades which were earlier not profitable can be successfully mined when metal prices are higher. From a mining company's perspective, there is no point in having more resources than to make sure that mining can continue at current level for an economically appropriate time. Thus, most mining companies will have resources and reserves that can cover the needs of the company for the next 10-20 years. This does not mean that there are no resources and reserves beyond those 10-20 years. Studies have shown that resources and reserves have grown over the 20th century as new deposits are found and explored (Crowson 2011) in spite of growing exploitation. There is thus no real long-term lack of resources or reserves. In the short term, demand may exceed supply with increasing prices as a consequence this has more to do with the limitations of production within mines than a lack of resources and reserves.

4.1. Common heritage of mankind

31. The Area and its resources are the common heritage of mankind. All rights in the resources of the Area are vested in mankind as a whole, on whose behalf the Authority acts. Activities in the Area which include exploitation must be carried out for the benefit of mankind as a whole. As such minerals extraction of minerals from the Area must be done so as to benefit mankind as a whole.

32. Minerals are extracted and refined into metals not for the metals themselves but for the products that they create downstream and for the societies they help build. In addition, metals can be recycled and reused infinitely. Minerals and metals are necessary for economic and social development and poverty alleviation. They can be the basis for further societal development if they and the profits they generate are used wisely. As such metals do benefit mankind. However, it is also important that an appropriate part of the mineral rent created goes to mankind and the development of societies. Presuming minerals can be extracted from the Area in a sustainable manner, a payment regime administered by the Authority would secure that such part of the mineral rent is also benefitting all mankind.

33. There might be a broader range of issues springing out of the resources in the Area being designated common heritage of mankind affecting how a suitable payment regime for deep seabed mining should be designed which are not discussed in this report. Its purpose is simply to survey fiscal regimes for land-based mining and especially royalty rates and the taxable base. To propose appropriate levels of royalties for deep seabed mining is outside the scope of our study. The study notes, however, that royalties on land-based mining have been developed over decades and centuries and are a tool for countries to appropriate part of the mineral rent. Maybe more importantly, these are a tool that has proven to function. Taking into account thus far the discussions within the open-ended working group of the

detailed definitions of resources and reserves. The Legal and Technical Commission has issued recommendations on this question in 2015. ISBA/21/LTC/15, Recommendations for the guidance of contractors on the content, format and structure of annual reports, Annex V 'Reporting standard of the International Seabed Authority for mineral exploration results assessments, mineral resources and mineral reserves'.

Council, royalties thus seems to be a useful starting point for the Authority to appropriate part of the mineral rent from deep seabed mining for the benefit of mankind as a whole. Subject to the discussion below, we find land-based mining fiscal regimes to be a useful starting point for determining suitable levels of deep seabed mining royalties.

5. The global mining industry

5.1. Global mining

34. The location of global mineral supply in the late 2010 is shown in figure 1 below. Mineral and metal production is increasingly coming from countries south of the equator and from emerging economies grouped mainly around the Pacific Ocean.

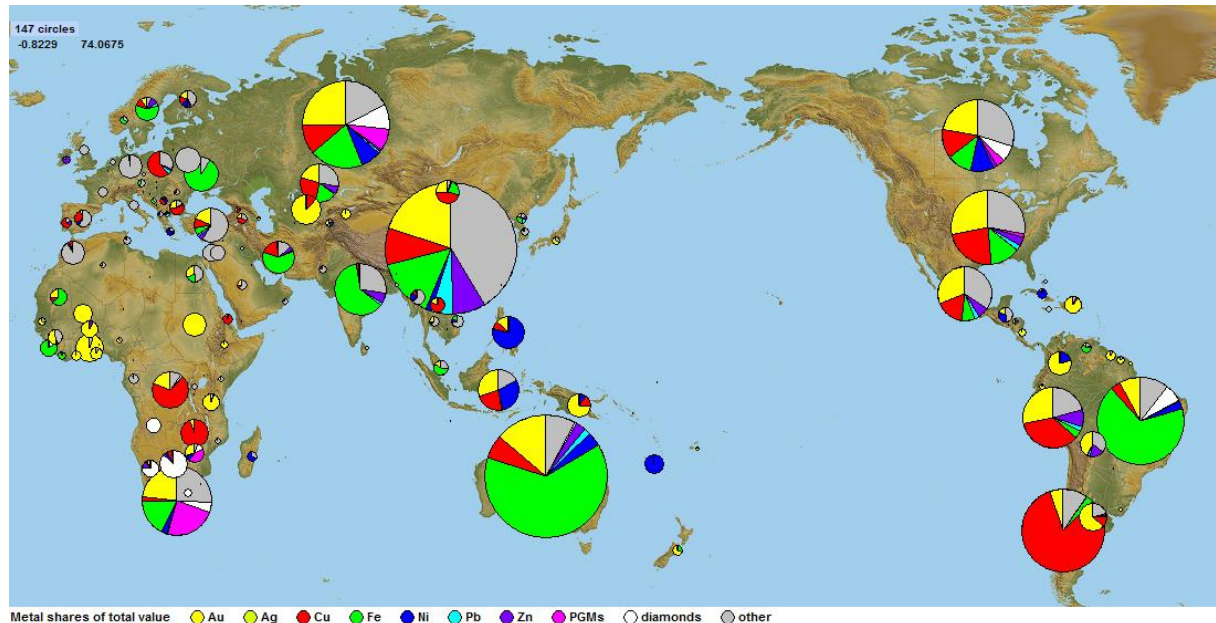


Figure 1. Value of mineral and metal production at the mine stage by country.

Source: RMG Consulting 2020.

35. In 2018, the total global value of mineral production, including coal, was around USD 1,414 billion. Coal accounted for roughly half of that amount. Global metal mine production is dominated in value and volume terms by three elements: iron ore, gold and copper. These three metals are roughly equal in value and together account for some USD 400 billion to USD 450 billion. This represents almost two thirds of the total value of production of all non-fuel minerals at the mine stage (i.e., before smelting and refining; see figure 2 below). The volumes of production, however, differ significantly, from iron ore at around 2,000 million tonnes (Mt) containing 1,500 Mt of iron, to manganese ore 53 Mt containing 19 Mt of manganese metal, to copper concentrates at 50 Mt with 17 Mt copper content, nickel at 2,233 kilo tonnes (kt), cobalt at 168 kt and gold at less than 3,000 tonnes (t).

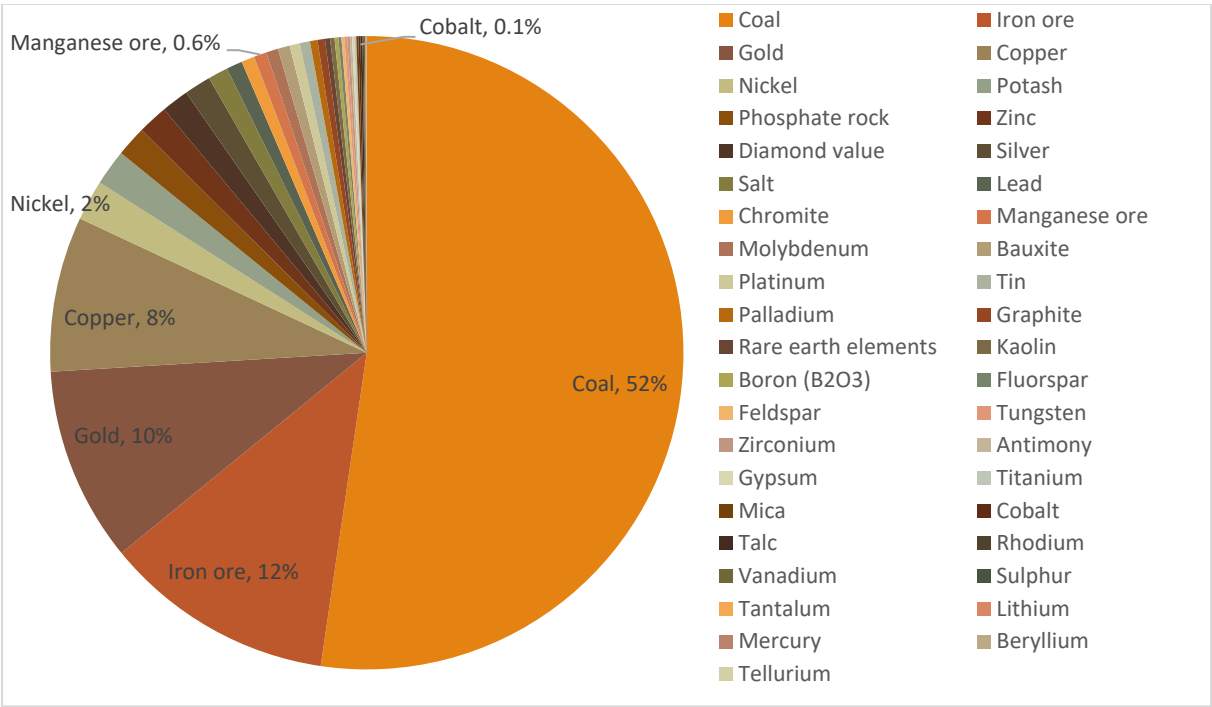


Figure 2. Total value at the mine stage by mineral/metal in 2018 (%).

Source: RMG Consulting 2020.

5.2. Countries under analysis

36. The value at mine stage of the production of cobalt, copper, manganese and nickel for the chosen countries is presented in figure 3 below.

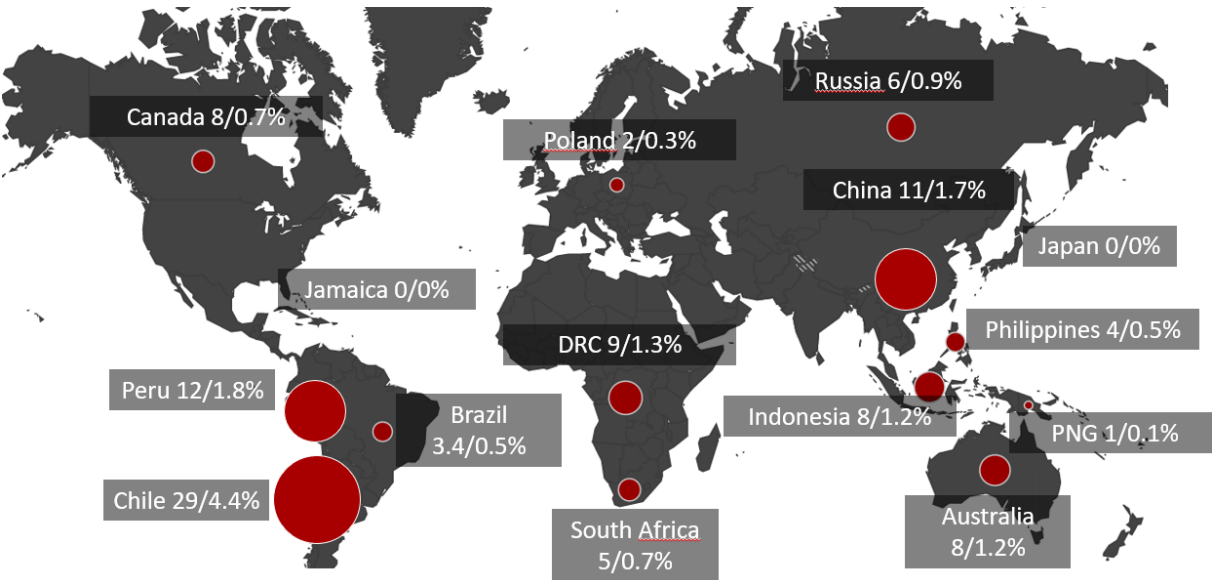


Figure 3. Value of production at mine stage for Co, Cu, Mn and Ni (USD billion/% of world) 2018.

Source: RMG Consulting 2020.

37. Among the countries only Australia and China produce all four minerals, see figure 4 below. Most countries produce two to three of the minerals, but three countries Chile, Peru and Poland produce only one, copper. However, the value of the production of copper in Chile and Peru together account for more than 40 percent of the total value of the four minerals produced in the 15 countries.



Figure 4. Value of production by metal (Co, Cu, Mn & Ni) and country 2018 (USD billion).

Source: RMG Consulting 2020.

38. The volume of production and share of global production are presented in table 1 below. The chosen 15 countries represent roughly 86 % of the total cobalt produced globally, 91 % of the copper, 66 % of manganese and 74 % of nickel. The selected countries thus cover the bulk of the industry for copper and cobalt. While the coverage for nickel is slightly lower the countries selected are representative and include the largest producers. For manganese the coverage is two thirds of global production and the major producing countries are also included. The manganese industry is structured with a few major producing countries and a number of equally important second tier countries. These include Gabon, Ghana, India and Ukraine which are not among the 15 countries selected. Hence the coverage is lower for manganese than for the other metals. However, the coverage is, in our opinion, sufficient to represent the tax regime in the global manganese mining industry.

Table 1. Production and share of global production by country and metal (Co, Cu, Mn & Ni) 2018 (kt, Mt & %).

Country	Cobalt (kt)	Co %	Copper (kt)	Cu %	Manganese ore (Mt)	Mn %	Nickel (kt)	Ni %
Australia	6	3 %	913	6 %	7	14 %	148	7 %
Brazil	0	0 %	381	2 %	3	6 %	74	3 %
Canada	5	3 %	539	3 %	-	0 %	180	8 %
Chile	-	0 %	5 832	35 %	-	0 %	-	0 %
China	9	5 %	1 591	10 %	9	17 %	99	4 %
Democratic Republic of Congo	109	65 %	1 225	7 %	-	0 %	-	0 %
Indonesia	0	0 %	651	4 %	0	0 %	509	23 %
Jamaica	-	0 %	-	0 %	-	0 %	-	0 %
Japan	-	0 %	-	0 %	-	0 %	-	0 %
Papua New Guinea	3	2 %	96	1 %	-	0 %	35	2 %
Peru	-	0 %	2 437	15 %	-	0 %	-	0 %
Philippines	5	3 %	70	0 %	-	0 %	345	15 %
Poland	-	0 %	401	2 %	1	1 %	-	0 %
Russian Federation	5	3 %	785	5 %	-	0 %	218	10 %
South Africa	1	1 %	47	0 %	15	28 %	43	2 %
Total 15 countries	145	86 %	14 969	91 %	35	66 %	1 652	74 %
Total World	168	100 %	16 500	100 %	53	100 %	2 233	100 %

Source: RMG Consulting 2020.

39. The contribution of mining to the economy of the 15 countries varies widely. In some such as Chile, the Democratic Republic of Congo, Papua New Guinea and Peru, mining is an important part of gross domestic product (GDP) and exports, and the mineral rents created and the tax income from mining make valuable contributions to tax revenues. While in others such as Poland, China and Japan, mining contributes much less to the national economy (Ericsson & Löf 2019).

6. Mineral fiscal regime

40. Metal mineral resources are usually vested in a State. Most governments however do not have the financial or technical capacity nor political will to develop these resources but rely on investors, domestic or foreign, to develop the nation's mineral resources. A mining regime combining legislation and taxation is created to balance society's need of metals and right to the mineral rents created when mining and the investors' demands for profit, stability and predictability.

41. When designing a fiscal regime for the extraction of minerals, governments have several objectives in addition to the goals for corporate taxation in general. Mullins & Burns (2016) give the following examples:

- Ensuring an appropriate overall level of government revenue over a project's lifetime;
- Securing dependable government revenue at all times during the project life;
- The ability to adjust to volatility, given the uncertainties in the sector – in particular, on prices, costs and geology;
- Limiting distortions to commercial decisions caused by the tax system;
- Limiting costs of administration and compliance, to tax authorities and companies respectively; and
- Ensuring transparency of fiscal terms and amounts paid by extractive industry companies.

42. These objectives are closely linked with the specific characteristics of the mining industry. To find and develop a mineral deposit is difficult and takes years of geological, engineering, economic, environmental and social studies. Today normally 10-15 years pass from finding a deposit to start a mine operation. It is a highly capital-intensive industry demanding large up-front investments. A mine can be operating for decades and sometimes centuries but the industry is always cyclical depending on the fluctuations of metal prices. Further a mine is fixed to the mineral deposit and cannot be moved. Finally, the State normally owns the mineral exploited.

43. The principal instruments available to governments to address the objectives are:

- Mining royalties – a percentage of production or gross revenue;
- Income or profit-based taxes – mainly corporate income tax; and
- Mineral rent tax – taxes that target profits in excess of those generally required to attract investments.

44. The balance between individual objectives and instruments and hence the tax regime chosen naturally differ between countries and jurisdictions for a range of historical, economic, geological and political reasons.

45. There are many other fiscal instruments and taxes that may impact a mining project during its lifetime. For example, these include withholding taxes, value-added taxes/sales taxes, custom duties, provincial and local taxes, taxes based on property value, stamp duties/transaction fees, transport-related taxes, taxes on fuels and electricity etc. Further there are indirect taxes like State participation, requirements to source goods and employees locally etc. There are further tax incentives and income tax adjustments to take into account like tax holidays, loss carry-forward opportunities, allowable expenses, interest deductions etc.⁴

46. National tax regimes are complex and difficult to describe, analyse and compare between countries and this is particularly the case in mining. To be able to correctly compare the mineral fiscal regimes between countries a model mine of a given size operating with defined technology mining a specified deposit must be used. Within this model all taxes can be applied and accounted for during the entire lifespan from exploration and construction to operation, rehabilitation and close down of the fictive mine. As the same model mine is used for each country a proper effective tax rate can be established and a correct comparison between fiscal jurisdictions can be made.

6.1. Mining royalties

47. A mining royalty is an amount paid to the government for the right to take the minerals vested in the state or a private owner (Mullins & Burns 2016). The International Monetary Fund (2016) states that royalties are levies on production, charged either as a fixed fee per unit of production (“specific” royalties) or as a percent of (a measure of) the value of production (“ad-valorem” royalties). ICMM (2009) gives a third type of royalty which are the profits-based or income-based royalties. James Otto et al. (2006) use a broad definition and states that a royalty is any tax that exhibits one or more of the following attributes:

- The law creating the tax calls that tax a royalty;
- The intent of the tax is to make a payment to the owner of the mineral as a compensation for transferring to the taxpayer the ownership of that mineral or the right to sell that mineral;
- The intent of the tax is to charge the producer of the mineral for the right to mine the minerals produced; and

⁴ A thorough discussion of mineral fiscal regimes and other taxes and levies for the mining industry can be found in for example Otto et al. (2006), ICMM (2009), Daniel, Keen & McPherson ed. (2010), Mullins & Burns (2016), Daniel et al. ed. (2017) and Otto (2017).

- The tax is special to mines and is not imposed on other industries.

48. A royalty should compensate a country for the removal⁵ of a non-renewable resource. Most countries levy a royalty. Royalties differ in respect of size and taxable base and is not necessarily uniform between metals nor companies. It may further vary between mines/companies within a country depending on the amount of ore produced or value created as well as individual tax agreements. For example in Canada (Ontario) a remote mine in the northern parts of the province is taxed at 5 % while mines in the southern parts are taxed at 10 %, a policy used to promote jobs and industry in remote areas. Royalties are levied on the metals contained in a concentrate or an ingot not on what mineral they are extracted from.

49. Many countries provide definitions of specific fiscal terms in their legislation applicable to the mining industry. These terms are included either in a mining code or in other appropriate legislation. In contrast, in some countries the specifics of the royalty/tax regime are often not included in the mining code or other legislation. Instead, they are set out in project-specific negotiated mining agreements.

50. A problem with royalties is that they increase production costs and hence diminish the total mineral resources and the mineral wealth of a country as they can make a marginal mineral deposit unprofitable which would have been profitable without the royalty.

51. The advantage of a royalty is that it is relatively easy to administer, and it can generate income over the entire period of a project. A consideration that might be important for countries with a less developed tax authority or in need of income.

52. Among the countries under study most employ a value-based royalty system; these include Australia (Queensland), Brazil (Minas Gerais), China, Democratic Republic of the Congo, Indonesia⁶, Jamaica, Japan, Papua New Guinea, Philippines, Russian Federation and South Africa. The royalty rates among these countries vary between 1-20 %, see table 2 below.

53. A royalty on weight or volume is less common. Among the countries and metals which are studied within this report none uses this set up. Australia (Queensland) does

⁵ While it is often referred to as “loss of” a non-renewable resource it should be noted that when metals are discussed these cannot be destroyed and the metal is simply removed from its original place to be incorporated into society where it can be used and reused. Further if the metal stays in the country where it was produced there is no loss to society as the mineral rent and the value added also will stay in the same country. However, the State might lose potential income as it is shifted to various corporations.

⁶ Indonesia base royalties in some cases on volume, see <https://isa.org.jm/files/files/documents/20200921-Annex-Final3.pdf> — Indonesia.

employ flat fees per tonnes produced for some minerals other than those studied in this report.

54. Profit-based royalties are fairly common. Depending on the definition of a royalty this type of tax could be considered as “other mineral taxes”. One reason for choosing such a system is, like in Canada (Ontario), to promote the industry and supports new mining projects. Ontario further employs tax exemptions for new mines, for a duration of 3 or 10 years depending on the location of the mine, like a means to encourage new development. Another country that uses a similar system is Chile. The Specific Mining Tax of Chile is based on the volume of refined copper produced. The tax payable is calculated at the applicable tax rate on the net operating income of the mining company. The profit-based royalty rates vary in Chile between 0.5-14 % depending on the weight of refined copper produced. In Canada (Ontario) the royalty is a flat 10 % or 5 % depending on location of the mine. Peru is yet another country that employs a profit-based royalty.⁷ Peru actually levies two separate royalties, both applies to operating income defined as revenues from sales less costs but one basis its royalty rate on operating margin while the other basis it on profit margin. The combined royalty in Peru varies between 3-19.9 %.

55. Poland has been left out of the discussions above as its mineral tax regime follows a non-conventional approach. While most countries operate a relatively straight forward royalty system Poland has a two-tier royalty system, with a third layer added for copper and silver. It consists of a mining concession fee and a mining exploitation fee. The mining exploitation fee, however, is partly an environmental levy as 40 % of it is paid into a special governmental environmental fund. The remaining 60 % is paid to local authorities where the mine is located. On top of this there is a special mining tax introduced in 2012 officially known as the “Tax on Certain Extracted Minerals” (*Podatek od Niektórych Kopalin*). This is de-facto the third tier of the royalty system in Poland. It only applies to copper and silver of which there is only one producing company the state controlled Polish Copper KGHM. The tax is based on the volume of production of copper and silver contained in concentrates (or in the mined ore if concentrates are not produced) and the average monthly price of copper and silver making it a de facto royalty. The complexity of the system is such that translating it to a simple percentage is difficult and the country uses a mix between volume based, value based and profit-based royalty systems.⁸

56. Thresholds below which royalties are exempt can be found in certain countries like Chile, Australia (Queensland) and Chile. In Australia (Queensland), for example, no royalty is payable on the first AUD 100,000 of the total value of a relevant mineral. In Chile taxpayers

⁷ For more information on the Peruvian royalty system see <https://isa.org.jm/files/files/documents/20200921-Annex-Final3.pdf> – Peru.

⁸ For further explanation of the Polish system of royalties see <https://isa.org.jm/files/files/documents/20200921-Annex-Final3.pdf> – Poland.

are exempt from the royalty if the annual sales are inferior to the equivalent of 12,000 tonnes refined copper.

57. Royalties are generally not dependent on what minerals are produced. Royalties are generally charged on the sales value reported by individual companies. If the royalty for various metals are the same percentage value, it does not then make a difference whether or not there are more than one metal in the ore sold. If the ore is polymetallic and royalties are different for various metals, the sales contracts needs to be studied for an understanding of how each metal is valued in the ore and then apply the various royalty rates for the separate metals. Many countries have developed standardized formulas for the calculation of the value of ore. These formulas rely on external, easily accessible, data and data that can be verified. The data usually includes amount of ore, metals and grades and an external official price for a metal, as for example LME prices. A factor that calculates the value of the specific ore in comparison to the metal is then applied. The royalty rate can then be applied on this simulated ore value.

58. The exact details of how to calculate the royalty naturally varies from country to country and is outside the scope of this study. As but one example from Poland, if there are several metals (by-products) the second metal is given a 50 % reduction in the royaltyrate.

59. Some countries have a fixed royalty rate, but many countries also use a span like South Africa where the royalty is between 0.5-7 %. The royalty rate in South Africa depends on several factors such as whether the mineral is refined or not, definitions of what is to be considered a refined mineral/metal is also provided by the same law. The minimum royalty percentage in the case of refined minerals is 0.5 % and the maximum royalty percentage is 5 %. In the case of unrefined minerals, the minimum royalty percentage is 0.5 % and the maximum royalty percentage is 7 %. The South African and other governments have adopted policies to promote downstream activities which are linked to the mining industry as a way to reduce the reliance on mining and diversify the economy. One way of doing so was to encourage domestic beneficiation of minerals through lower royalty rates of refined minerals/metals. Many different ways are employed to determine royalty rates – Peru for example increases the royalty rate with operating or profit margin. The royalty rate in Chile depends on the mining operational margin. The Philippines have a basic royalty of 4 % which is supplemented with a compensation to the landowner of between 1-5 %.

60. Half of the countries which are studied in this report have the same royalty rate independently of metal. The other countries employ different royalty rates depending on the metal produced.

61. The fact that the tax base for royalties varies between countries makes comparisons difficult. A 10 % royalty on profits is clearly not the same as a 10 % royalty on the theoretical

value of production. However, the choice has been made to group them all together for the sake of the discussion below.⁹

⁹ For more information on each country and their fiscal regimes and royalties etc.
<https://isa.org.jm/files/files/documents/20200921-Annex-Final3.pdf> .

Table 2. Royalty rates per metal and country 2020 (%).

Country	Royalty rate copper	Royalty rate cobalt	Royalty rate manganese	Royalty rate nickel
Australia (Queensland) *	2.5-5 %	2.5-5 %	2.70 %	2.5-5 %
Brazil (Minas Gerais) *	2 %	2 %	3 %	2 %
Canada (Ontario) **	5.0 % or 10.0 %	5.0 % or 10.0 %	5.0 % or 10.0 %	5.0 % or 10.0 %
Chile **	0.5-14 %	No	no	No
China *	2-8 %	2-20 %	2-20 %	2-20 %
Democratic Republic of Congo *	3.50 %	10 %	3.50 %	3.50 %
Indonesia *	4 %	n.a.	n.a.	2-10 %
Jamaica *	5 %	5 %	5 %	5 %
Japan *	1-1.2 %	1-1.2 %	1-1.2 %	1-1.2 %
Papua New Guinea *	2.50 %	2.50 %	2.50 %	2.50 %
Peru **	3-19.9 %	3-19.9 %	3-19.9 %	3-19.9 %
Philippines *	5-9 %	5-9 %	5-9 %	5-9 %
Poland ***	PLN 3.70 (~USD 0.92) per metric ton + Special mining tax	PLN 4.25 (~USD 1.05) per metric ton	PLN 4.25 (~USD 1.05) per metric ton	PLN 4.25 (~USD 1.05) per metric ton
Russian Federation *	8.00 %	8.00 %	4.80 %	8.00 %
South Africa *	0.5-7.0 %	0.5-7.0 %	0.5-7.0 %	0.5-7.0 %

Source: RMG Consulting 2020.

Notes: *royalty based on value of mineral, ** royalty based on profit, *** royalty based on volume.

Peru has two royalties imposed in parallel, <https://isa.org.jm/files/files/documents/20200921-Annex-Final3.pdf> for further details.

63. The lower spectrum of royalty rates is found between 0.5-5 %. Outliers include those applied in the Democratic Republic of Congo with a fixed 10 % for cobalt and in the Russian Federation with a fixed 8 % for copper, cobalt and nickel. On the other end of the scale royalty rates are distributed generally between 5-14 %. China with a royalty rate as high as 20 % on cobalt, manganese and nickel stands out in comparison to other countries. Also Peruvian royalties, with a theoretical maximum royalty of 19.9 %, are higher than other countries'. However, Peruvian royalties are profit based and deductible against profit tax.

64. Copper royalties are between 0.5-19.9 %, see figure 5 below. The average copper royalty among those countries with a value-based royalty is 4.0 %. The two most important countries of copper production among the countries under study are Chile and Peru. Chile has a profit-based royalty between 0.5-14 %. Peru levies two separate royalties both applies

to operating income defined as revenues from sales less costs. Included in the figures 5-8 below are the combined royalty which can vary between 3-19.9 %.

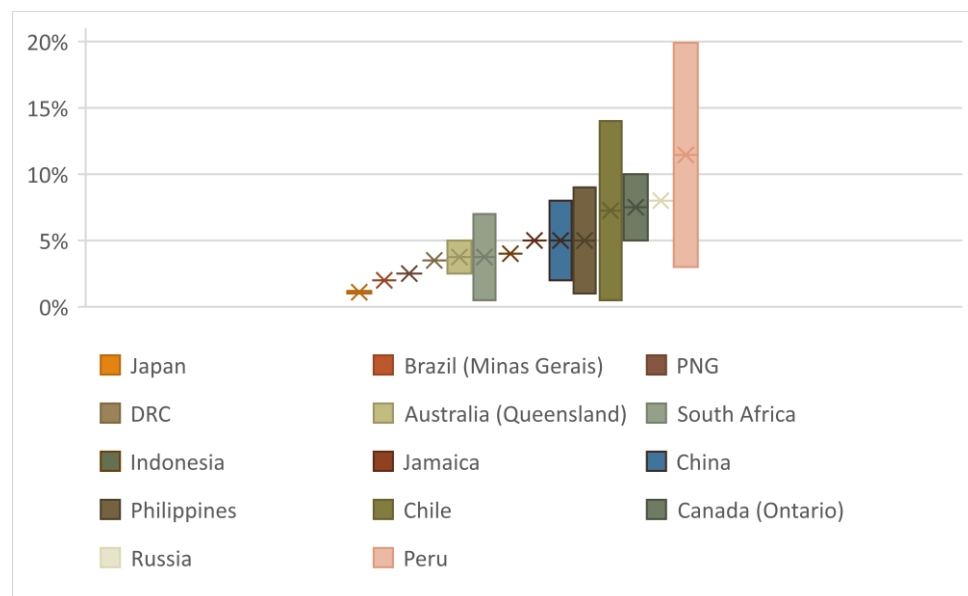


Figure 5. Copper royalty rates (average and extremes) per country 2020 (%).

Source: RMG Consulting 2020.

Note: Poland is not included in any of figures 5-8 as it does not use per centage royalty. Countries with zero royalty are not included.

65. Cobalt royalties are between 1-20 %, see figure 6 below. The average cobalt royalty among those countries with a value-based royalty is 5.4 %. The dominant producer of cobalt, Democratic Republic of Congo, has a flat 10 % a value-based royalty.

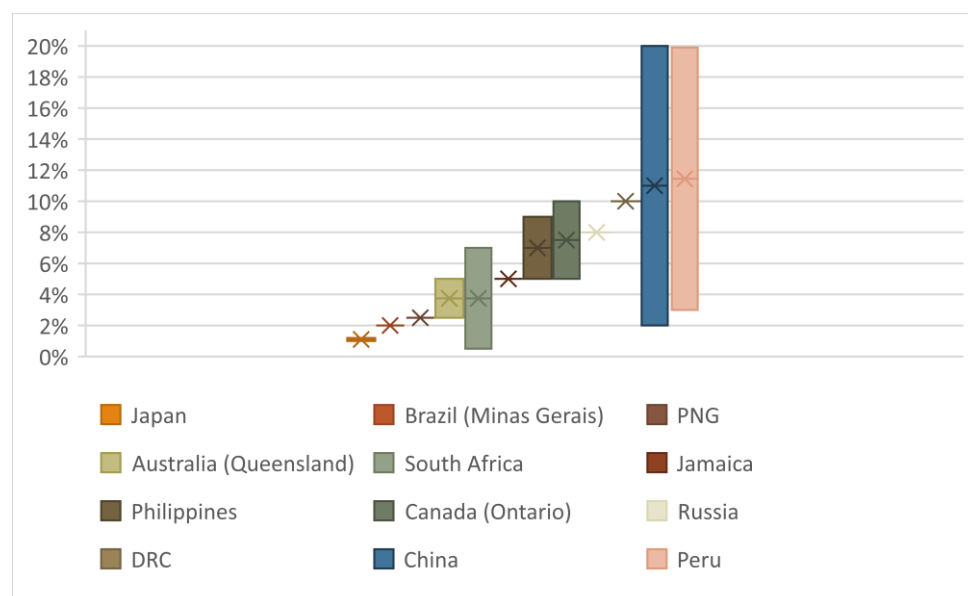


Figure 6. Cobalt royalty rates (average and extremes) per country 2020 (%).

Source: RMG Consulting 2020.

66. Manganese royalties are between 1-20 %, see figure 7 below. The average manganese royalty among those countries with a value-based royalty is 4.4 %. The most important producer of manganese is South Africa with a value-based royalty rate of 0.5-7 %. Other important producers are China (2-20 %), Australia (Queensland, 2.7 %) and Brazil (Minas Gerais, 3.0 %), all using a value-based royalty.

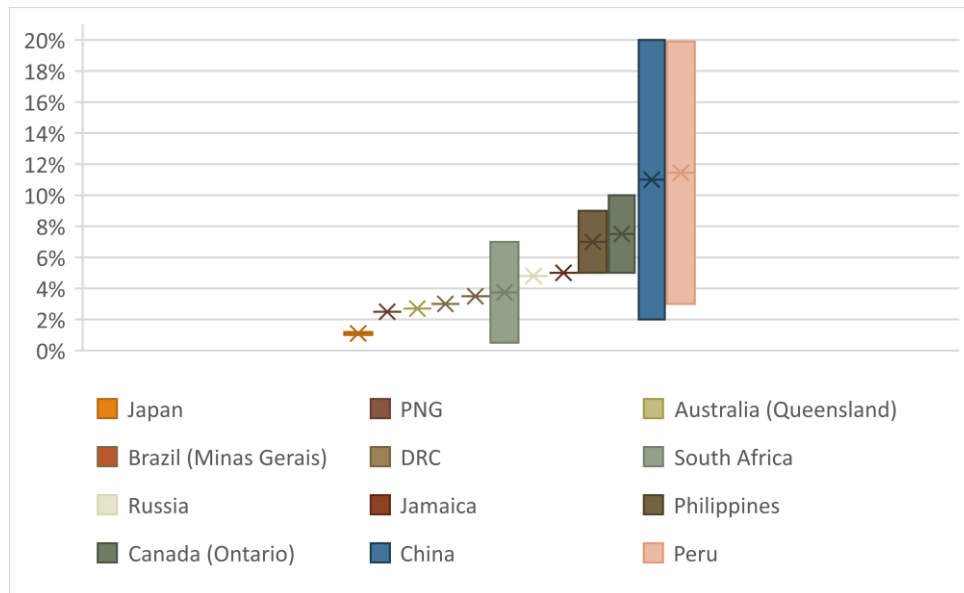


Figure 7. Manganese royalty rates (average and extremes) per country 2020 (%).

Source: RMG Consulting 2020.

67. Nickel royalties are between 1-20 %, see figure 8 below. The average nickel royalty among those countries with a value-based royalty is 4.9 %. The most important producer of nickel is Indonesia with a royalty rate of 2-10 % and the Philippines with a royalty rate of 5-9 %, both using a value-based royalty.

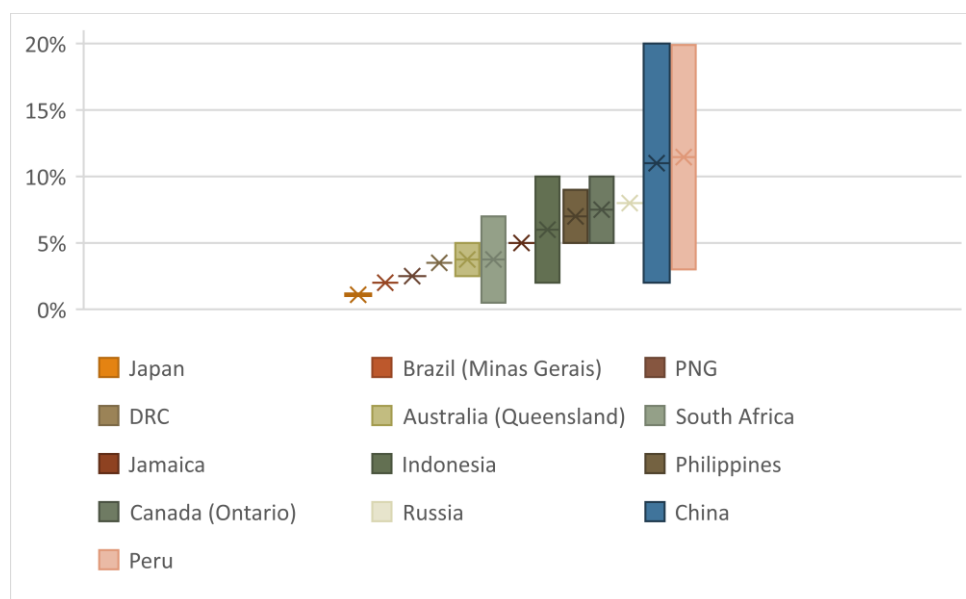


Figure 8. Nickel royalty rates (average and extremes) per country 2020 (%).

Source: RMG Consulting 2020.

68. Several observations can be made from figures 5-8, from the material found in this link <https://isa.org.im/files/files/documents/20200921-Annex-Final3.pdf>¹⁰ and from discussions with national experts concerning the detailed calculations of royalties in specific countries.

69. Royalty rates are directly related to the geological foundation and the economic situation of a country. The larger producing countries of certain minerals tend to have higher royalty rates for those minerals. If a country can charge a high royalty, because its geological foundation is such that companies can make high profits, the country tends to do so. At the same time countries with a less important mining industry tend to have a lower royalty as they try to encourage investments in the mining sector.

70. Royalties are charged regardless from what minerals the metals are extracted. A copper or nickel royalty rate is the same for a sulphidic ore and an oxidised ore. Without having had the possibility to go into such detail for every country it is clear that specific practices and models are often designed to simplify calculations of royalty payments. When applying an ad-valorem royalty the price/value of the product sold, possibly with certain deductions, gives the tax basis for the royalty. By applying the same royalty rate to several metals some of the difficulties in calculating the value of multi metal product can be avoided.

71. It is important that the Authority has the right to collect and verify all data necessary for the calculation of the royalty to be paid.

¹⁰ See paragraph 15 supra.

72. More developed economies tend to have more complicated systems based on profit while less developed economies want to make sure that tax funds will materialize on a predictable basis. Royalties are thus part of a changing landscape. The royalty tax base tends to change with policy decisions taken and the capabilities of a country's tax authority. The royalty rate also follows policy decisions but is probably more influenced by an individual country's capability of charging a certain royalty rate, be that high or low.

73. A company is ultimately interested in profits: if it can earn more from an alternative investment it will make that investment instead. Royalties are thus never limited to a country but always coexist with all other royalties in all other countries. This also means that a high royalty in one jurisdiction might not be comparable, on a rate-by-rate basis, with another country. The effective total tax rates might be different but also because the geological foundation might be completely different. In the end it is thus the mineral rent that dictates the ability of a country to charge a royalty. This would seem to be a clear case for mineral rent taxes, but those are more complex and harder to administrate, and most countries has settled on royalties as a means to an end, while not perfect at least it is relatively easily administered and to a certain extent predictable.

74. One possible and simple way to narrow the band of suitable royalty rates for the Authority is take the tax base, i.e. the production volumes into account. For example, between 60-70 % of global cobalt production originates from the Democratic Republic of the Congo with a royalty rate of 10 %, following are three countries each accounting for a production around 3 % of global production. Two of these countries apply a royalty rate between 2.5-10 % and some of the remaining use rates as high as 20 %. Without doing detailed arithmetical calculations we suggest a royalty rate for cobalt of 10 %. With similar approximations for the other metals we arrive at the following bands: 5-10 % for copper, 2-7 % for manganese and 5-10 % for nickel. In order to simplify calculations of a seabed royalty, it might be reasonable to consider a flat rate for cobalt, copper and nickel between 5-10 %. The exact level should preferably be obtained after model calculations of royalty payments of a deep sea bed mining product compared to royalty payments made in some of the most important land-based producer countries.

6.2. Other mineral taxes

75. Other mineral taxes are often, but not always, designed to tax the mineral rent. Mineral rent is the difference between the value of production for a stock of minerals at world prices and their total costs of production.¹¹ As minerals in the ground are generally considered property of the State the argument is that these rents, the excess profits, belong to the State, or if they are privately held to the landowner. Since companies are recuperating their expenses and are getting a profit that is enough to attract new investment, a rent tax does not theoretically influence a company's decision to invest or decrease a country's

¹¹ See World Bank <https://datacatalog.worldbank.org/mineral-rents-gdp-1>

resource base. There are thus many reasons to tax rent. However, few countries have introduced an additional tax on mining.

76. Among the countries which are studied, the Democratic Republic of Congo and Peru have currently some form of other mineral taxes while Australia, for a brief period, had a federal “super profit tax”.

77. The Democratic Republic of Congo has a super profits tax when commodity prices exceed a base value (the price used in the feasibility study) by 25 %. The tax rate on super profits is set at 50 % and income subject to the super profit tax is not subject to CIT. The tax base, the super profit, is determined from the gross operating surplus.

78. Peru uses the Special Mining Burden (SMB). This is not a tax as determined by general legal principles given that it is not a compulsory payment imposed under Peru’s authority to levy taxes. The SMB is considered a “voluntary” payment. Mining companies with pre-2011 fiscal stabilization agreements may elect to pay it on a voluntary basis to help build schools, hospitals, roads, electricity and water supplies that are much needed to reduce infrastructure bottlenecks.

79. Australia introduced the federal Minerals Resource Rent Tax in 2012. It was a tax on profits generated from the mining of non-renewable resources and targeted “super profits”. The tax did not manage to generate any larger incomes to the State. It was expected to generate some AUD 22.5 billion over the first four years. This was later revised and in the 2012 budget it was expected to generate AUD 3 billion. However, the tax only raised some AUD 200 million. The Minerals Resource Rent Tax proved to be complex and expensive to operate and it was repealed in 2014.

6.3. Losses and deductions

80. Mining projects involve long lead times between initial investment and profitable operation. The cyclicity of the industry with metal prices fluctuating widely make profitability also swing up and down. The regulations for carrying forward losses, amortisations, deductability etc. are hence parts of a fiscal regime which are in general more important for mining companies than in other economic sectors. This study does not go into any detail of these aspects but lists some general regulations in the different countries (<https://isa.org.im/files/files/documents/20200921-Annex-Final3.pdf>).

7. Administrative fees

81. Administrative fees are a small part of the total cost for developing and running a mining operation. The costs are, in comparison to taxes and royalties, fairly low. The fees and levies are commonly designed to cover costs for the administration of the industry by governmental bodies and to make sure that exploration and mining is carried out effectively and continuously.

7.1. Exploration permit

82. The exploration permit fee is levied for obtaining exclusivity during exploration and priority if something is found. Normally the amounts charged are relatively limited. Australia for example applies a fee of AUD 164.9 (USD 112) per sub-block (approximately 3 km²) approximately USD 0.13 per hectare, see table 3 below. Often the fee is divided between a fixed part for the application and a variable part based on size of area. The fee is often combined with work commitments. Further the fee might increase with time, as in Brazil where the amount to be paid is BRL 3.55 (0.66 USD) per hectare increasing to BRL 5.33 (USD 0.99) per hectare after a certain period of time. The fee and potential time frames for the exclusivity are generally designed to make sure that companies do not sit on potential valuable properties without developing them. The fees should in most cases cover the costs for administration at the governmental bodies and might include for example the maintenance of a mining cadastre as well as control and monitoring of exploration activities. The general fee is found in the bracket of USD <1-5 per hectare.

Table 3. Administrative fees per country 2020.

Country	Exploration / Prospecting permit	Mining claim
Australia	Exploration - AUD 164.9 (USD 112) per sub-block (approximately 3 km ²). Mineral Development Licence - AUD 2,678 (USD 1,821).	Mining lease - variable rent AUD 63.7 (USD 43) per hectare. Application fee other AUD 1,671 (USD 1,136).
Brazil	Annual Tax per Hectare BRL 3.55 (USD 0.66) per hectare during the original (first) period of the exploration rights. During the eventual extension period the amount is BRL 5.33 (USD 0.99) per hectare.	Annual Tax to control and monitoring the mining activity to be paid by tonne of ore extracted the value of the fee is BRL 1.48/t (USD 0.28) of ore.
Canada	1 unit (16 hectare) CAD 20.40 (USD 16), 2–6 units CAD 40.80 (USD 30), 7–16 units CAD 61.20 (USD 45).	To keep a claim "in good standing" 400 CAD (296 USD) per unit. Tax on exploration and mining 4 CAD (3 USD) per hectare and year.

Chile	A concession to work a mine shall be based on payment of an annual license fee the amount of said fee shall be one tenth of a Monthly Tax Unit (UTM), for each full hectare, in the case of a concession to mine, and, one fiftieth of said unit for the same area, in the case of a concession to explore. " UTM January 2020 CLP 49.673 (USD 0.063)	
China	Prospecting right user fee. For the first three years, the permit holder must pay CNY 100 (USD 14) per square kilometre each year, increasing by an additional CNY 100 (USD 14) per square kilometre each year from the fourth year onwards. The maximum fee is capped at CNY 500 (USD 70) per square kilometre each year.	Extraction right user fee. This fee is CNY 1,000 (USD 140) per square kilometre per year. However, under the Plan to Reform the Regime of Assignment of Mining Rights, prospecting right user fee and extraction right user fee will be replaced with mining right occupancy fee which will be subject to dynamic adjustment based on the price of relevant mineral resources and economic development needs.
DRC	Annual surface duty of USD 5,89 per square km	Operating license USD 424.78 /square km. Exploitation permit fees USD 0.04 /hha 1st year USD 0.06 /ha 2nd year USD 0.07 /ha 3rd year USD 0.08 /ha from 4th year. Annual surface duty of USD 5.89 /square km.
Indonesia	USD 4 /hectare	
Jamaica	Prospecting right or renewal: JMD 5,000 (USD 35). Prospecting license JMD 10,000 (USD 70). Temporary permission to mine or renewal thereof JMD 10,000 (USD 70). Special prospecting licences (per metric square) JMD 600 (USD 4.2)	Mining lease (per metric square) JMD 1,200 (USD 8.4). Renewal (per metric square) JMD 600 (USD 4.2).
Japan	Mining application fee: JPY 112,600-109,100 /application (USD 1,013-1,045). Registration licence tax: JPY 180,000 /application (USD 1,671). Mining area tax - Exploration block: JPY 200 (USD 1.86) per year per ha - Mining area: JPY 400 (USD 3.71) per year per ha - Sand field (both trial and mining): JPY 200 (USD 1.86) per year per ha	
PNG	Exploration licence (includes extensions) PGK 5,000 (USD 1,435),	Mining lease 5-10 ha PGK 2,500 (USD 718), 10-50 ha PGK 5,000 (USD 1,435), 50-500 ha PGK 10,000 (USD 1,870), special mining lease PGK 500,000 (USD 143,505), Alluvial mining lease PGK 250 (USD 72), Mining easment PGK 10,000

		(USD 1,870). Extension for leases 50 % of grant application fee.
Peru	0.25 % of monthly revenues to regulatory bodies plus USD 3/hectare in "Good standing fee".	
Philippines	Exploration fee is PHP 300 per hectare.	Occupation fees PHP 75.00 (USD 1.5) per hectare outside mineral reservations, PHP 100.00 (USD 2) per hectare inside mineral reservations including offshore areas.
Poland	For all the minerals including metallic ores – PLN 121.93 (USD 30) per square km. The variable element does not apply in case of exploration entities. Annual fee beyond year three of exploration licence is escalated according to a table reaching 400 % of standard fees in year five and up to 800 % in year eight in case of the advanced exploration licence. Fees for using state-owned geological information charged on a case-by-case basis, which could be significant, e.g. USD 200,000 for geophysical information over a large area.	The <i>fixed element</i> is a small percentage of the value of the deposit mined based on its <i>proven reserves</i> , and varies depend on mineral from 0.0005 % of the deposit in-situ value to 0.1 %. For metallic ores it is 0.005 %. The metal price used is published annually by the Treasury. In production years beyond year one a depletion correcting factor is also used to reflect the diminishing resource. The variable element is calculated as a fraction (5-50 %) of the exploitation fee paid by the miner in the preceding year. For metal mining it is 30 %. This means that the royalty (exploitation fee) is paid twice – once in its own right in a given year, and the second time (as a fraction) in the following year as part of the concession fee.
Russia	Licenses are issued by auction to the highest bidder. Bid fee to participate in a tender or auction and signing bonus for award of the subsoil licence applies. Licence fees are prescribed by specific terms of any licence agreement.	
South Africa	minimum fee ZAR 1,000. Rate ZAR 1.0/ ha increasing by ZAR 0.5 per year up to 5 years. Renewal, minimum fee ZAR 2,800. Rate ZAR 5.0 increasing by ZAR 1.0 per year up to three years.	The terms and conditions of a production right agreed upon will be approved by the Minister.

Source: RMG Consulting 2020.

7.2. Mining permit

83. The mining permit fee is for getting and maintaining the right to mine a property. The fee is generally higher than the exploration fees. Often the fee is divided between a fixed and a variable part as in Australia (Queensland), application fee AUD 1,671 (USD 1,136) and

AUD 63.7 (USD 43) per hectare. The variable part can be based on area for example, most common, like in Queensland above and in Canada (Ontario) with CAD 400 (USD 296) per unit ie. 16 hectare or for example per tonne ore extracted as in Brazil BRL 1.48 (USD 0.28) per tonne of ore. The fee is generally for covering costs for the governmental bodies in controlling and monitoring mining activities.

84. While the cost of mining permits per hectare often are many times the cost of exploration permits, a mining permit is generally only needed for a much smaller area, the mine and its immediate surroundings. The actual amounts being paid for a mining permit are relatively limited compared to other costs of mining. However, sometimes the amount charged is considerable, like the special mining lease in Papua New Guinea at PGK 500,000 (USD 143,505).

8.Environmental levies

85. Very few, if any, countries use only environmental levies to reduce harmful emissions. Most countries prescribe limits of emissions and demand from companies that they shall invest in measures to prevent emissions above the set limits. The levels of emissions are monitored during the production period and action taken if limits are surpassed.

86. There are however countries that enforce environmental taxes and levies in combination with setting limits to emissions to reduce environmental damages and cover costs for monitoring discharges to nature by mining activities. China for example has an Environmental Protection Tax which prescribes air pollutants, water pollutants, solid waste and noise pollution tax amounts.

87. Australia (Queensland) while prescribing limits to emissions also sets fixed fees for environmental disrupting activities for example mining of copper ore AUD 179,064 (USD 121,782) annually for each mine and further fees may apply for the processing of the ore. The fees in Australia (Queensland) are used for monitoring and cleaning up old mine sites etc.

88. Another way of combating environmentally dangerous pollution which could be seen as a form of environmental levy is requiring companies by law to set aside certain amounts to use in the future for rehabilitation and in case of accidents etc. This is a common practice in many countries. These funds are generally not integrated into the State budget but kept separately by the responsible company on a mine by mine basis.

89. Among the 15 countries studied Poland is the only one, which has adopted a system that is specifically using part of the royalty payments for environmental purposes. In Poland 40 % of the main component (the mining exploitation fee) of royalty payments is set aside into a government controlled environmental fund which is used for unspecified environmental purposes and not earmarked for any specific mine(s). In addition to this national fund Poland has a system common to other countries of individual funds set up by each company.

90. The Authority is currently providing for the establishment of an environmental compensation fund (ECF) to compensate for damage not covered by contractors and/or sponsoring states. The existing practices in land based mining discussed above give us reasons to conclude that such an ECF, with suitably detailed purpose and modalities, should be a workable solution which is similar to existing systems and processes applied to land based mining.

9. Corporate income tax

91. Corporate income tax (CIT) is a part of any mineral fiscal regime. Revenues from CIT are particularly important in developing economies. According to OECD on average some 13.3 % of total tax revenues come from CIT (OECD 2019) however for Africa the figure is 18.6 %. During the last two decades CIT rates have fallen globally, yet the revenues from CIT has increased (OECD 2019). The average CIT level in the OECD Corporate Tax Statistics Database is 23.2 %, excluding jurisdictions with a 0 % CIT, and the median is 25 %. Further, with the increasing trade and a globalization of economies CIT levels have been converging, which explains the uniform level of CIT among the countries under study. It is however important to acknowledge that for a thorough comparison between jurisdictions the effective tax rate needs to be discussed and compared.

92. For the countries studied the CIT rate applicable to mining companies has been used which differs in some cases from the rates reported in the OECD Corporate Tax Statistics Database. CIT levels are similar in most of the 15 countries studied for this report, 12 of the countries have CIT rates between 20-30 %, see table 4 below. Jamaica with 33.33 % has the highest CIT level while Poland (19 %) and the Russian Federation (20 %) have the lowest levels. However, two countries, Brazil and Peru, have additional mandatory taxes that increase the direct tax burden. Brazil with its Social Contribution on Net Profits (Contribuição Social sobre o Lucro Líquido – CSLL) of 9 % gives the direct tax incidence top rate at 34 %. Peru with a CIT rate of 29.5 % has 2 % extra for companies with stability agreements and 8 % additionally in workers' participation, a profit share system, for mining companies. The average CIT top rate for the countries studied, including mandatory extra corporate taxes, are 28.3 % and the median is 29.7 %.

93. Among the studied countries Brazil with a CIT rate of 34 (25+9) %, China 25 %, Japan 29.7 %, Poland 19 % and the Russian Federation 20 % are States sponsoring activities in the Area under a contract for exploration with the Authority. Their average CIT rate is 25.5 % somewhat higher than the average for the total 15 countries studied. The average CIT rate for all sponsoring states are 24.7 %. The CIT charged in Japan is among the highest in the 15 countries studied while Poland and the Russian Federation have the lowest CIT levels. Conclusions drawn from these relatively minor discrepancies should however be carefully considered.

Table 4. Corporate Income Tax rates for mining companies per country 2020 (%).

Country	CIT %
Australia	27.5-30 %
Brazil	Corporate income tax is 25 %. Social Contribution on Net Profits (Contribuição Social sobre o Lucro Líquido – CSLL). This contribution is levied at 9 % and to be paid after the Income tax so it is added to the CIT. Direct tax incidence top rate around 34 %.
Canada	26.5 % (Ontario CIT 11.5 %, Federal CIT 15 %).
Chile	25-27 %
China	25.0 %
Democratic Republic of Congo	30.0 % (The standard CIT is 35 %, mining companies are subject to a reduced CIT rate).
Indonesia	25 %. Reduction of 5 % for companies registered on the Indonesian Stock Exchange (IDX) and for holders of Contract Of Works.
Jamaica	33.33 %. Unregulated Company: 25 %.
Japan	29.7 %
Papua New Guinea	30.0 %
Peru	29.5 %. 2 % extra for companies with stability agreements. 8 % additionally in workers' participation, a profit share system.
Philippines	30 % (being reduced to 25 %). Local business tax (maximum 2 % of gross sales).
Poland	19 % (Reduce rate of 9 % for 'small taxpayers' – entities with a turnover of less than EUR 1.2 million (including VAT)).
Russian Federation	20.0 %
South Africa	28.0 %

Source: RMG Consulting 2020.

94. The effective tax rate is dependent on a number of detailed general regulations on how to treat depreciation, use of tax losses etc. As mentioned above there are also a number of aspects which are particularly important for the mining industry such as how to deal with exploration costs, the many years long period between start of investments and first income and the cyclicity of the industry depending on the high volatility of international metal prices. This makes exact comparisons of effective tax rates in the mining industry particularly complicated.

95. The OECD has developed a model for forward-looking effective corporate tax (Hanappi, T. 2018). Data is presented in the OECD Corporate Tax Statistics Database and is modelled on three scenarios. The OECD corporate effective tax rate incorporate a wide range of generic, of which CIT is one, and country-specific tax provisions. The OECD model, therefore, enables researchers to conduct cross-country and within-country, as well as cross-asset analyses aimed at many relevant policy questions, such as for example, the evaluation of how the tax system provides incentives to invest in one type of asset versus another. This gives a broader understanding of the total taxes paid by corporates in various jurisdictions.

As an example the Composite Effective Average Tax Rate modelled for Australia is 29.9 % in the low interest and inflation rate scenario compared to the top level of CIT at 30 %. Brazil on the other hand in the same scenario has a Composite Effective Average Tax Rate modelled at 30.1 % compared with the direct tax incidence top rate around 34 %. According to the OECD the Composite Effective Average Tax Rate modelled for the countries studied in this report is 25.6 % (all 15 countries except the Philippines) and for 16 of the sponsoring states (some countries do not report to the OECD) the rate is 23.7 %.

96. When countries make decisions about royalty rates the CIT system has no or only very minor influence. Likewise, when setting CIT rates in most (if not all) cases the royalty rates and its tax base of calculation do not influence the CIT rates. Further, the CIT rates in a specific country are generally the same for all branches of industry irrespective of other taxes or fees paid. A royalty is strictly speaking not a tax but a compensation for minerals extracted owned by somebody else – most often it is considered a national patrimony of a country – in this case humankind through the Seabed Authority. Comparison of royalty regimes for sea bed mining with land based mining should thus not include CIT, and CIT should not be a factor of importance when considering a fiscal regime for the Authority.

10. Conclusions

97. In light of the comparative analysis of the data collection from the selected 15 countries, the following conclusions can be drawn.

- **Seabed mining in a global comparison**

98. The 15 countries studied include all major producers of the four metals potentially produced by seabed mining and, except for manganese, a clear majority of total production. For manganese, several countries not among the 15 selected produce relatively important volumes of metal but inclusion of any of these countries would most likely not change the conclusions drawn below.

99. Copper is the most economically important metal of the four metals and is also in volume terms much bigger than all the others.

- **Mineral tax regimes are converging and constantly changing to be competitive.**

100. Over the past decades countries have been revising their mineral tax regulations more frequently than in the late 20th century in order to remain or become attractive for investors.

101. It will hence be necessary also for the Authority to be able to adjust and revise the seabed fiscal regime in the future in order not to unbalance the competitive situation between land and deep seabed mining.

- **It is difficult to compare mineral tax regimes.**

102. In order to establish the effective tax rate of a mineral tax regime *all* taxes levied on a mining operation over its entire life from exploration to rehabilitation must be considered. It is also necessary to define what mineral is mined and what metal is produced in a model mine. This approach is out of the scope for this study, but a detailed review of rates and taxable bases in different countries together with a careful analysis should be sufficient to create a base for a suitable fiscal regime for deep seabed mining.

- **Analysis of the taxable rate and of the basis for the calculation of royalties and of any deductible costs in the case of a value-based royalty**

103. Royalty rates vary from 2-3 % up to 10-12 % (excluding outliers) depending on a range of factors from history of mining, political focus in each country to how the taxable base is defined. An ad valorem royalty is the most common regime among the countries

studied. The royalty system has developed over a long period of time and is relatively easy to administer. A tax on the mineral rent created might be an alternative but there are limited examples of how such a tax would be designed in detail and of how it would work in reality.

104. Countries with better geology, higher grades in ores which are easier to concentrate, smelt and refine have been able to levy higher royalty payments than countries with deposits of lower quality and still attract investments.

105. Exactly which level of royalties to use and how to define the taxable base for seabed mining can only be established through model calculations which is not part of this study. It can however be concluded that an ad valorem royalty with a separate royalty rate for each metal would be a system closely resembling the most common land based royalty regimes. Indications for range of suitable royalty rates for each metal can be obtained by focusing on the levels in the most important producer countries: 10 % for cobalt, 5-10 % for copper, 2-7 % for manganese and 5-10 % for nickel.

106. A simple and transparent model is recommended. One possibility to simplify royalty calculations could be to use the same royalty rate for all metals provided this does not significantly change the total amount of royalties paid compared to a model with separate royalty rates.

- **Comparative analysis of administrative fees within the selected 15 countries**

107. Fees for exploration and mining permits are commonly levied in order to cover administrative costs and to ensure that exploration and mining is done effectively and continuously. An exploration permit is commonly valid for up to 10-12 years. Fees are often increasing with time in order to open up ground for competitors.

108. Most countries want exploration companies to spend their funds on enlarging the geological knowledge rather than paying fees and hence fees are relatively low. Some countries combine an exploration fee with defining a prescribed amount which the license holder has to spend on geological work in order to maintain their exclusivity over a specific area.

109. Administrative fees are not a relevant factor in considering a seabed tax regime as on land these fees are generally set at a low level which does not significantly impact the economics of land-based mining.

- **Comparative analysis of environmental levies within the selected 15 countries**

110. Few countries use environmental levies, i.e. charges for environmentally harmful emissions.

111. The common model is to set limits to emissions which must be followed. The company must simply make the investments necessary to keep emissions within the set limits.

112. In most countries companies have to set aside funds to guarantee that rehabilitation and clean up in case of accidents can be made even if the company for whatever reasons (bankruptcy for example) has to stop its operations. This could be an avenue to consider for the Authority.

- **Comparative analysis of corporate income tax regimes within the selected 15 countries**

113. The same caveats for comparing mineral fiscal regimes are valid for comparison of CIT regimes. In general, however, CIT levels are set in a narrow band between 20-30 %. Individual countries' CIT regimes should not be of particular importance when defining a tax regime for seabed mining.

11. References

CIM (2014) CIM Definition standards for mineral resources & mineral reserves. Canadian Institute of Mining, Metallurgy and Petroleum, Westmount Quebec. Available at: https://mrmr.cim.org/media/1128/cim-definition-standards_2014.pdf

Crowson, P (2011) Mineral reserves and future minerals availability, *Miner Econ* (2011) 24:1-6. Mineral Economics. Available at: <https://doi.org/10.1007/s13563-011-0002-9>

Daniel, P., Keen, M. & McPherson C ed. (2010) *The taxation of petroleum and minerals: principles, problems and practice*. Routledge.

Daniel, P., Keen, M., Swistak, A. & Thuronyi, V. ed. (2017) *International taxation and the extractive industries*. Routledge.

Ericsson, M & Löf, O (2019) Mining's contribution to national economies between 1996 and 2016. *Mineral Economics* (2019) 32:223-250. Available at: <https://doi.org/10.1007/s13563-019-00191-6>

Hanappi, T. (2018), "Corporate Effective Tax Rates: Model Description and Results from 36 OECD and Non-OECD Countries", *OECD Taxation Working Papers*, No. 38, OECD Publishing, Paris. Available at: https://www.oecd-ilibrary.org/taxation/corporate-effective-tax-rates_a07f9958-en

ICMM (2009) *Minerals taxation regimes – A review of issues and challenges in their design and application*. International Council on Mining and Metals, London. Available at: <https://www.icmm.com/website/publications/pdfs/social-and-economic-development/minerals-taxation-regimes>

Luca, Oana & Puyo, Diego Mesa (2016) *Fiscal Analysis of Resources Industries (FARI) Methodology*. International Monetary Fund, Fiscal Affairs Department. Available at: <https://www.imf.org/external/pubs/ft/tnm/2016/tnm1601.pdf>

Mullins, P & Burns, L (2016) The fiscal regime for deep sea mining in the Pacific region, *Marine Policy* 95 (2018) 337-345, Elsevier. Available at: <http://dx.doi.org/10.1016/j.marpol.2016.07.018>

OECD Corporate Tax Statistics Database. Available at: <https://www.oecd.org/tax/beps/corporate-tax-statistics-database.htm>

OECD (2019) *Corporate Tax Statistics – first edition*. OECD. Available at: <https://www.oecd.org/tax/tax-policy/corporate-tax-statistics-database-first-edition.pdf>

Otto, J (2017) *The taxation of extractive industries*, WIDER working paper WP2017/75. UNU-WIDER, Helsinki. Available at: <https://www.wider.unu.edu/sites/default/files/wp2017-75.pdf>

Otto, J., Andrews, C., Cawood, F., Doggett, M., Guj, P., Stermole, F., Stermole, J. & Tilton, J. (2006) Mining royalties: a global study of their impact on investors, governments, and civil society, The International Bank for Reconstruction and Development / The World Bank, Washington, D.C. Available at:
<http://documents.worldbank.org/curated/en/103171468161636902/pdf/372580MiningOr101OFFICIAL0USE0ONLY1.pdf>

United Nations (2016) Agreement relating to the implementation of part XI of the United Nations convention on the Law of the Sea of 10 December 1982.
https://www.un.org/Depts/los/convention_agreements/texts/unclos/closindxAgree.htm

World Bank, accessed 2020 <https://datacatalog.worldbank.org/mineral-rents-gdp-1>



Photos from Swedish mining in the 18th to 20th century.