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# Amazonia: Mining, taxation, and regional development

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## Resumo

Neste artigo, apresentam-se algumas lógicas que fundamentam a tributação, a cobrança de royalties e o estabelecimento de favores fiscais, analisando-se as possibilidades de usar essas compensações para favorecer a articulação da mineração com dinâmicas de enraizamento social do desenvolvimento. Conclui-se que na Amazônia não há políticas públicas de concessão de favores fiscais que induzam as empresas mineradoras a adotar comportamentos que contribuam para o desenvolvimento regional. Constata-se também que as alíquotas de royalties fixadas no Brasil são relativamente baixas, o que se deve mais a uma apropriação desigual do poder político do que a uma restrição microeconômica.

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## Palavras-chave:

Mineração, tributação, royalties, desenvolvimento regional.

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## Abstract

This paper presents arguments that are the foundation for taxation, charging of royalties, and establishment of fiscal benefits, analyzing the possibilities of using compensations like these to enhance linkages between mining and dynamics of socially rooted development. The paper concludes that there are no public policies in Amazonia for granting fiscal benefits that induce mining companies to adopt behavior that contributes to regional development. It is also observed that royalty rates set in Brazil are relatively low, which is due more to unequal appropriation of political power than to any microeconomic restriction.

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## Keywords:

Mining, taxation, royalties, regional development.

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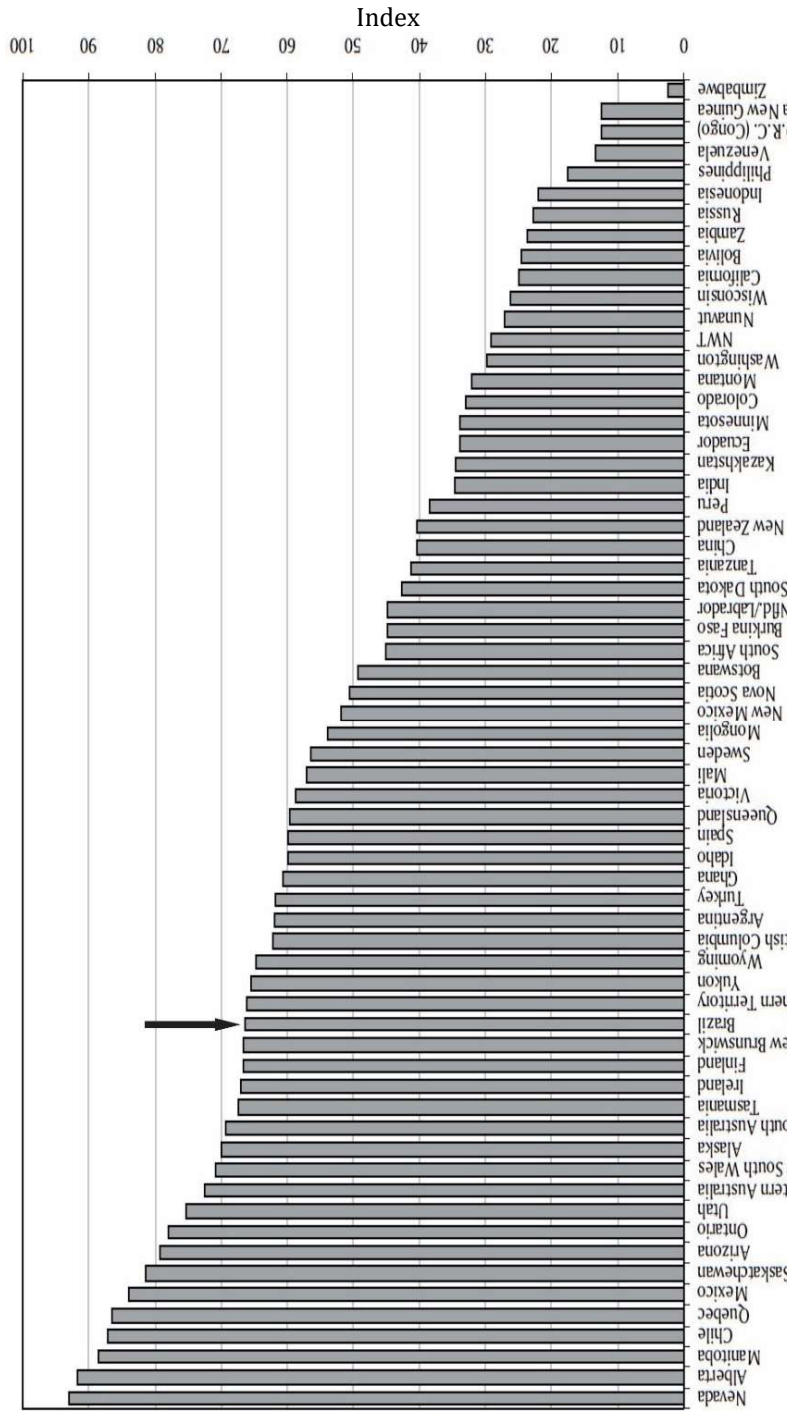
## INTRODUCTION

While considering geological, historical, market-related and logistical reasons, one must broaden reflections on the conditions in which it is possible to convert mineral resources from Amazonia into vectors of socially rooted development. This is particularly important, as, in the global context, few countries have greater possibility of attracting investments in this sector than Brazil (Graphic 1). Furthermore, in the first decade of this century, mining will be responsible for most of the investments made in the eastern part of the region.

One must take into account that the social and economic results of mining, in regional terms, have strengthened dynamics favoring concentration of income, homogenization of productive processes, and poorly-qualified adding of value to the region's natural capital. Many challenges exist to building social, economic, political, and environmental networks based on mining, in terms of interactions with this activity and regional socioeconomic conditions. Networks that should be able to drive regional development based on the building of productive systems that could stimulate local dynamics of innovation. This, in turn, would contribute to establishing productive processes whose competitive advantages would not solely be based on low-cost access and use of the region's environmental resources and services.

One possibility to connect mining activities with more general development dynamics is the use of fiscal linkages. This enables society, through governmental structures, to capture part of the value generated by the commoditization of mineral resources. It generally occurs through taxes incurred both on extraction and sale, as well as on profits earned by the companies that add value to the mineral resources. Nevertheless, the volume of tax revenues originating from this activity has dropped due to widespread tax exemptions. This occurs because the federal and state governments - in order to promote the adding of value to the region's mineral resources, end up lowering taxes, fees and other contributions, or even establishing public prices and financial compensations, thus limiting the State's capacity to capture part of the value generated by mining.

This paper discusses the fundamental logic of taxation (*lato sensu*) and granting of fiscal benefits, and analyzes the possibility of using these compensations to promote connections between mining and dynamics of socially rooted development.



Graphic 1: Mineral potential index.  
Source: Fraser Institute, (2004)

## 1- FISCAL BENEFITS LINKED TO SIZE OF INVESTMENT

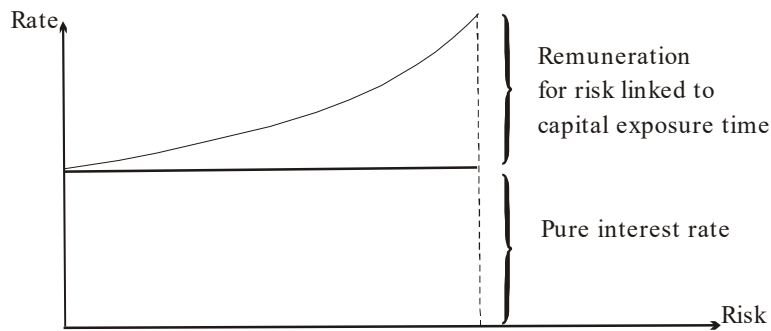
Activities aimed at adding value to mineral resources to meet global demand are capital-intensive. They require large investments in mineral research in order to locate new deposits and for the development of the mining enterprise. According to Parsons (2000, p. 8), the Canadian government, for example, calculated that approximately US\$ 586 million dollars are spent each year mineral prospecting research to substitute mines in use in that country. The costs of building the structures necessary for mining a world-class mineral deposit are also high and its economic viability is intrinsically connected to the size of the ore deposits, which should be ever larger. Therefore, resources are being mined in increasingly more remote areas in relation to where the demand for them is, due both to growing global demand as well as depletion of more accessible reserves, requiring construction of infrastructure and logistics that are only compatible with progressively larger mines (BARHAM; BUNKER; O'HEARN, 1994).

Mackenzie's study (1998), based on the analysis of mineral deposits in Chile, indicated that the average size of a base metal deposit is 171 million tons, and in the case of precious metals, 19 million tons. There are 17.23 billion tons of iron ore deposits in Carajás; there are 191 million tons of copper deposits at the Sossego mine, also in the Carajás region, and 674 million tons of bauxite at Rio Trombetas. Costs of enterprises building and running world class mines can therefore reach more than US\$ 3 billion dollars. Moreover, installation of a mine requires the purchase of a large quantity and diversity of equipment. Usually, such equipment is so specialized, it must be equally specialized suppliers spread around the globe.

Since mining is an activity that requires large capital investments, the return on which implies significant risks, mining companies commonly defend the need for special tax incentives to enable them to address these specificities. This argument has gained increasing strength in modeling tax systems, especially in the 1980s and 1990s, a historic moment when liberal thinking had

more sway. One can also find the existence of negotiations between mining companies and governments that resulted in special tax regimes.

One of the main justifications for providing tax exemptions is that capital costs involved in the installation of mining enterprises tends to decrease according to how rapidly financing sources are reimbursed. From the perspective of financial capital, inasmuch as it is a risk venture, the less time capital is exposed, the lower the index that represents this factor shall be in forming remuneration costs of the transaction (Figure 1).



**Figure 1:** Schematic representation of interest rate variation due to exposure time of financial capital.

Source: Prepared by author.

Thus, mining entrepreneurs tend to obtain more favorable loan risk classification, and consequently, lower interest rates for an enterprise that presents the capacity to more quickly lower its debts related to its installation. Therefore, mining companies seek to allocate maximum initial income to paying down debts and reducing financial costs. Mackenzie (1998), in turn, estimates that an average return rate of 10% is an acceptable capital cost for mining a mineral deposit.

To construct the equation for allocating income from the mining enterprise's initial years of operation, the company strives to maximize amortization of financing, and seeks sources to do so. This is where negotiations with governments occur with the objective of reducing taxes, for a determined period of time, on the enterprise (tax holidays).

An example to be cited is the case of mining the copper deposit in Sossego, in Eastern Amazonia. Companhia Vale do Rio

Doce (CVRD) will invest US\$ 413 million dollars there, and it will take two years to start production and at least another two to reach the forecast production level of 350,000 tons of copper concentrate per year (140,000 tons of copper), which will enable mining for a period of 17 years. Considering the forecast of US\$ 1.35/ton as the sale price of copper concentrate and the estimate, announced by the company, that the operating costs will be US\$ 0.32/lb., equivalent to US\$ 0.71/kg, the mine will have an average operational cost of 52.22% of the sale price of the copper concentrate. There are yet other additional costs, which can reach 10% of the gross revenue of the mine. Thus, the mine, in the fourth year of the project, when it shall probably reach the forecast mined volume, will have a pre-income tax profit of approximately US\$ 177 million dollars per year (Table 1). The company will pay the project's financiers with this revenue. The longer the payment period, the higher the interest rates charged by capital not from the company. Thus, when presenting the enterprise's profitability, the possibility of lowering income tax rates is of great relevance, because it will impact not only the overall figures of the company, but will also affect the financing charges by third-party capital used to finance the mining enterprise (Figure 1).

**Table 1:** Estimated annual income and profit from the Sossego mine in full production phase (in US \$).

Elements	Values	Percentages
Gross Income	470,000,000	100%
Operational expenses	-245,434,000	-52.22%
Other deductions from Gross Income	-47,000,000	-10.00%
Net Income	177,566,000	37.78%
Income and contribution taxes	58,596,780	12.47%
Annual Profit	118,969,220	25.31%

Source: Prepared by author, based on information from the CVRD Directorate of Non-Ferrous Products.

In the case of the Sossego mine, considering the need to effect investments of US\$ 413 million dollars in the first two years (2003 and 2004), lowering the income tax rate by 75% for the enterprise's first 10 years of operation will enable recovery of the

investment in 5 years. Without the reduction in income tax, the enterprise's recovery period would increase to 7 years.

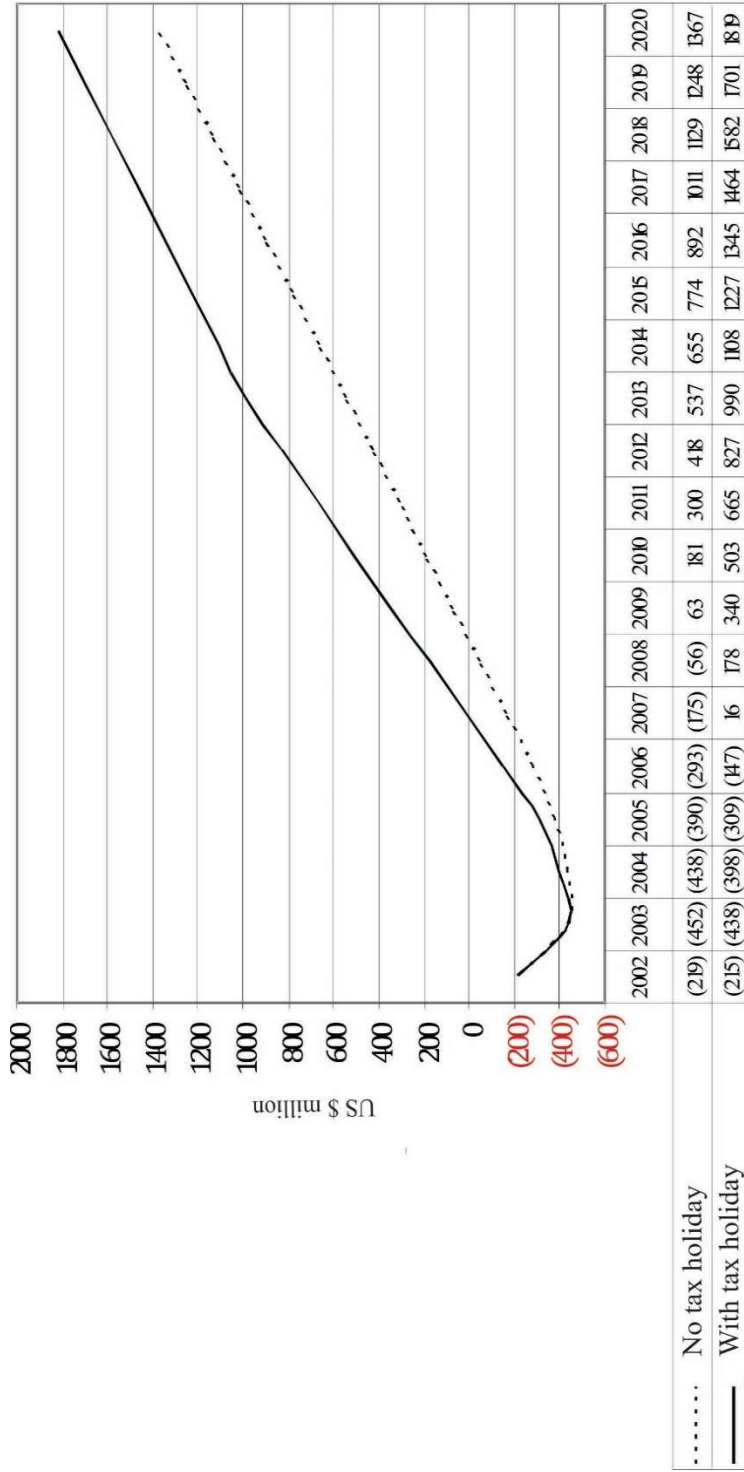
Consider a presumed ratio of equity/debt of 50% - that is, half of the resources needed for the installation came from loans - and presume that the part originating from third-party financing would be paid at a rate of 8% APR, but if the time for recovering the capital were increased to 7 years, the interest rate would be raised to 12% per year (Graphic 2).

Regarding profitability of the Sossego mine, simulating absence of income tax-linked fiscal benefits would result in an average return rate of 21.23%. With the reduction, the return rate would reach 32.75%, estimated as a difference of accumulated profits from the enterprise of over US\$ 450 million dollars (Graphic 2). In these terms, the existence of a special taxation policy on income earned by a mining enterprise is of great relevance to its profitability. In Brazilian Amazonia, these fiscal incentives are contractual, being approved individually for each enterprise, and currently include income tax reductions of up to 75%. They used to be established within the scope of SUDAM - Superintendence for Development of the Amazon, currently known as the Amazon Development Agency (ADA).

As cited by Otto (2000), tax reductions in the first years of a mining operation, as a form of compensation for the huge investments needed, is practiced by some countries (Table 2). According to the author (2000, p.13), some investors consider this type of fiscal incentive as the determinant factor for installing an enterprise involved in mining activities. In return for this fiscal benefit, however, the State has not been managed to have the companies establish counter-compensations, in terms of rendering local development more dynamic.

Parsons (2000) shows that Canada, for example, offers tax regimes for mining activities that allow the mining company to recover its capital costs before paying income tax. This recovery of capital costs is obtained through authorization to deduct up to 100% of the tax due on the capital expenditures performed during the pre-production phase. Also, during the first years of production, income tax payments are reduced, which enables the enterprise to liquidate its debts from its installation more quickly. There are also tax policies that determine relatively high depreciation rates, compared with those in the United States or China (Table 3).





**Graphic 2:** Simulation of accumulated investments and profits resulting from installation and operation of Sossego copper mine in Eastern Brazilian Amazonia.

Source: Prepared by author, based on information from the CVRD Directorate of Non-Ferrous Products.

**Table 2:** Existence of periods of exemption or of tax reductions for mining enterprises.

Country	Tax Holidays
South Africa	Yes
Argentina	Yes
Australia (Western Australia)	Yes
Bolivia	Yes
Brazil (Legal Amazonia)	Yes
Canada (Ontario)	Yes
Chile	No
China	Yes
Ivory Coast	Yes
Ecuador	Yes
United States (Colorado)	Yes
The Philippines	Yes
Ghana	Yes
Guyana	Yes
Indonesia	Yes
Kazakhstan	Yes
Mexico	No
Papua New Guinea	No
Peru	No
Poland	Yes
Surinam	Yes
Tanzania	Yes

Source: Andrews-Speed (2000); Mackenzie (1998); Otto (2000, 2001); Otto; Cordes (2002); Parsons (1998, 2000).

On the other hand, installation of the mining enterprise requires importation of equipment. Taxation on importation of this equipment or even collection by the national government of added-value taxes leave the mining enterprise very vulnerable to tax policies related to these items. Charging value-added tax - as well as Tax on Circulation of Goods and Services (ICMS) in Brazil, - based hypothetically on a rate of 10%, which applies to nationally-produced equipment necessary to set-up of the mine, or even a 10% tax on importation of equipment, results in costs of up to US\$ 50 million dollars for a mine whose installation costs involve purchase of equipment costing some US\$ 500 million dollars.

**Table 3:** Possibility of applying depreciation on typical mining equipment (selected countries).

Country	Depreciation
South Africa	Yes
Argentina	Yes
Australia (Western Australia)	Yes
Bolivia	Yes
Brazil	Yes
Canada (Ontario)	Yes
Chile	Yes
China	Yes
Ivory Coast	Yes
Ecuador	Yes
United States (Colorado)	Yes
The Philippines	Yes
Ghana	Yes
Guyana	Yes
Indonesia	Yes
Kazakhstan	Yes
Mexico	No
Papua New Guinea	Yes
Peru	Yes
Poland	Yes
Surinam	Yes
Tanzania	Yes

Source: Andrews-Speed (2000); Mackenzie (1998); Otto (2000, 2001); Otto; Cordes (2002); Parsons (1998, 2000).

Considering the significance these taxes can represent in the cost formation of an enterprise, mining companies, as a rule, request tax compensations. Since world-class deposits represent revenue opportunities, in the medium term, of over US\$ 100 million dollars (MACKENZIE, 1998), governments in most countries offer some type of fiscal incentive related to equipment purchases in order to attract investments, particularly if production from the mine is destined to the foreign market (OTTO, 2001). Indonesia, for example, uses fiscal instruments that allow the mining company to be exempt from value-added tax (VAT) during the period of construction of the mine installations and infrastructure. The mining company also receives fiscal incentives that enable it to import machinery and equipment exempt from importation taxes. This is a common practice, as many governments recognize the importance of the mining

industry and offer several fiscal incentives to accelerate the company's recovery of installation costs (OTTO, 2001).

## 2 LONG-TERM RISK INVESTMENTS AND REPERCUSSIONS ON TAXATION

Compared to other economic activities, mining involves high risks, not only in the geological research phase, but also in the other phases of the life cycle of the project - the mine development and production phases. The level of risk involved for investment capital in this activity causes investors to seek higher rates of return than for other activities. For Parsons (2000), as a general rule, the acceptable base level of return on investment in a mining enterprise ranges between 15% and 18%. According to the author, a medium-sized gold deposit located in the state of Colorado in the United States would have an average return rate of 14.14% over 10 years of production. Such a rate of return might be very attractive in other economic activities. Due to the high risks of mining activities and with this level of return, however, mining such a deposit would probably not occur. Another deposit, with the same geological conditions, located in Chile, would have a rate of return of 18.34% and would therefore be above the levels of return that according to Parsons (2000), are capable of compensating the risks of this type of activity from the standpoint of capital. In this case, the difference in economic return could be credited to the tax regime in Chile. Actually, the abovementioned study by Mackenzie (1998), shows the existence of mining enterprises in Chile with an average rate of return of 25%. The level of return is largely due to tax policies practiced in that country, which highly favor mining companies. The author estimates that mines in the Amazon that receive exemption or income tax reduction benefits can have an average return of more than 30% (Table 1, Graphic 2).

Mining is a long-term investment. If mining from precious metals mines such as gold from the Bahia River in Carajás can extend for a decade, mining of base metals, such as bauxite in Trombetas, may span over 5 decades, and the hematite mines of Carajás may surpass a century of mining activity. Economic activities forecast for such long periods can suffer various variations in important elements for the enterprise such as the price of the mineral, operational costs, taxes etc. These variations in fundamental parameters cause the risk for these types of projects to be high.

Another possibility in terms of taxation, used to reduce the impact of fluctuations in mineral commodity prices on profitability of capital invested in mining is future compensation, or in some cases, even retroactive compensation of these capital losses (Table 4).

Due to the long duration of investments, mining companies seek to negotiate mechanisms to minimize the variation in taxation applied to the enterprise over the period of its existence, in order to reduce the risk factor. Parsons (2000) shows that some countries seek to offer more stability to the tax laws to which enterprise is subject, by incorporating the tax regime in a bilateral contract between the government and the mining company. This type of practice was adopted, for example, in Indonesia, where a contract signed between the government and the mining company, whose fundamental terms are approved in parliament and are of the general public domain, establish that in the case of changes in legislation, the government ensures protection of the rights and obligations of the company, including regarding taxation, during the life cycle of the mine. Parsons (1998) also reminds that some countries have a hybrid regime: there is one tax regime that applies as a standard system for the majority of mines, but certain mines are subject to exceptionally determined tax rules, performed through a bilateral contract established between the government and the mining company. In Guyana, for example, taxes that apply to the Omai mine are determined by a contract established between the mining company and the government.

**Table 4:** Possibility of compensation for loss.

Country	With Future Gains	Retroactive
South Africa	Yes	No
Argentina	Yes	No
Australia (Western Australia)	Yes	No
Bolivia	Yes	No
Brazil	Yes	No
Canada (Ontario)	Yes	Yes
Chile	Yes	No
Ecuador	Yes	Yes
United States (Colorado)	Yes	Yes
The Philippines	Yes	No
Mexico	Yes	No
Peru	Yes	No

Source: Andersen (2001); Andrews-Speed (2000); Andrews-Speed; Rogers (1999); Mackenzie (1998); Otto (1998, 2000, 2001); Otto; Cordes (2002); Parsons (1998, 2000).

### 3 COMPENSATION FOR DEPLETION OF A NON-RENEWABLE RESOURCE

Mining has another peculiarity compared to the majority of economic activities, as it exploits mineral resources that will no longer be available to society. This is a peculiarity that has direct repercussions in the surcharges that apply to this activity. Thus, worldwide, there is an almost generalized acceptance of the idea that mining, due to its peculiarities, should pay additional taxes, as it utilizes a resource that will no longer be available to society and should offer compensation for the permanent loss of that asset. In other words, a compulsory tax should be charged as a means to include the cost of depleting social equity.

Consequently, in terms of surcharges applied to mining of mineral resources, in addition to normal taxation to which all activities are subject to, an additional tax is necessary so that society recovers at least part of the value of the resource whose use is granted exclusively to one company.

It is understood that the differentiation of public surcharges incurred by mining activities are justified by the fact that the formation of the deposits did not involve human effort, and such deposits can be considered fortuitous gifts provided by nature. Having been provided by nature, they should not be property of anyone specifically, and should belong to society in general, represented by the State. The resulting benefit of its use should, therefore, be shared by the society at large, and not be appropriated only by the party that utilizes it.

This understanding of mineral resources as social equity has been manifested worldwide in the principle of separation of property above-ground from property below-ground and in the principle of permanent and inalienable sovereignty of the State over mineral resources within its territory.

When granting exclusive usage rights of mineral resources of its ownership to third parties, the State usually demands some form of payment, as would the owner of any other resource. This payment is normally called a royalty - payment made to the state for direct use of mineral resources of its ownership. Although it may seem to be similar to, and in some countries, may even be called a tax, conceptually a royalty is not a tax.

Ownership of mineral goods, it should be noted, varies from country to country. In a few countries, the landowner can charge

royalties for mining, but in most cases, mineral resources are assets of the national State itself or institutions that represent it. Thus, frequently, it is up to the national State to establish the collection of royalties.

In some countries, the mineral goods are properties of the units that compose the national State (provinces, states, etc.); in this case, they are responsible for taxing use. In Malaysia, for example, most of provinces are owners of the mineral reserves and establish rules for payment of royalties within their jurisdictions. In Australia, there are various royalty regimes due to their legal framework is set up. Australian mining legislation is established at state or territory level, including with regards to royalties. Each state, therefore, establishes its own regimes for compensation of depletion of its mineral resources. In Canada, another large global producer of ores, provinces also have the autonomy to legislate on mining activities within their territories, and due to this fact, within the country, they charge royalties and taxes on revenue earned by mining companies. Each province establishes different policies for charging of additional levies on mining companies, for the purpose of compensating the province for depletion of its mineral resources. In the United States, royalties are paid to the federal government whenever mining takes place on lands that belong to the federal government. The royalties vary from 12% to 14%. At the state level, there is a multiplicity of “compensatory taxes”, analogous to royalties, whose rates and calculation methods vary from state to state. In some states, royalties apply to the sale price of the product; in others, to the net income of the companies or even a specific value for each ton of mineral mined. Generally speaking, in the US, rates for “compensatory taxes” charged by the state vary between 1% and 7%.

According to Otto (2001), in the last few decades, debate has arisen in some countries of colonial origin regarding the property rights of mineral reserve of ancestral people and indigenous tribes that live or lived in times past in areas where the mineral reserves are located. The recognition of the ancestral populations’ rights over mineral resources results, in some cases, in the adoption of distinct legal instruments to provide compensation. In some states of Australia, for example, aboriginal populations were given the prerogative to privately negotiate payments for prospecting and compensatory royalties for mining on lands of these traditional

populations. In other countries, such as the Philippines, and in some states of the United States, portions of royalties collected by the State are reverted back to the native populations.

One may say that, in general terms, the system of charging royalties has taken on two basic forms: The specific royalty and the ad valorem royalty.

The specific royalty consists of payment of a fixed amount per unit produced. Its main advantages are revenue stability, simplicity, ease of administration, and difficulty of evasion. It also has considerable disadvantages. Being insensitive to costs, the specific royalty penalizes lower-grade ores, thus promoting selective mining. In this case, for the mining company, the royalty is an additional variable cost that raises cut-off, and consequently, reduces recoverable reserves, at times even rendering mining of the deposit unfeasible. Such a result depends on uniformity of the grade, being more intense in the cases where it is subject to large variations. The specific royalty is completely insensitive to variations in revenue and the existence of economic rent. India uses, in certain cases, a specific royalty system and in order to not promote selective mining, varies the value of the royalty considering the grade contained in the ore. In the case of iron ore, the government charges 24.50 rupees per ton of ore with a grade superior to 65% and 14.50 rupees per ton of ore with a grade superior to 62%, following an incremental range of royalties that specifically consider the grade of the ore. These values are equivalent, in both the cases cited, respectively to US\$ 0.54 and a US\$ 0.32 per ton of iron ore.

On the other hand, the *ad valorem* royalty is applied in the form of a tax on the sale price of the mineral. It offers a reasonable degree of stability to revenue, and in many cases, results in simplicity and ease of administration. However, there are situations in which there may be considerable difficulty in determining the taxable value. Even though it varies with revenue, the *ad valorem* royalty is also a variable cost to the producer. China, for example, charges ad valorem *royalties* on mineral production in its territory.

Worldwide, there are cases in which both the *specific* royalty and *ad valorem* royalty may be established through licensing or in project-by-project negotiation. It is quite common, however, for governments to impose royalties in the form of general rules,



without any relation to the specific conditions of each project, although it may consider variations for different groups of mineral substances.

Royalties were traditionally *specific* or *ad valorem*, but have taken on new forms. In the last few decades, some countries or states have begun to emphasize collection systems based on the profits of mining companies, thus directing the basis for collecting royalties to the level of additional profitability of the mining companies, and not sales value or to a specific tax.

In this case, it is a question of the possibility of charging the mining company a royalty for use of the natural resource - not to compensate for its depletion, but because adding value to that natural resource provides the mining company with the generation of a “differential” income that companies in other sectors do not receive. - a differential that should therefore be the basis for collection of a royalty, in other words, for establishing an additional tax on the mining companies’ profitability. Many authors, including Bunker (2000), argue that charging royalties could be perfected from the governmental point of view, if this principle were adopted as the principle for collecting royalties. He advocates that, instead of taxing income obtained from mining, such as in the case of the CFEM - Financial Compensation for Use of Mineral Resources, the government could have a share in the net income of the mine, in other words, the economic rent that it could generate.

There are arguments, however, against this principle of linking the collection of royalties to a surcharge on the profitability of a mine. According to the former argument, mining companies, or even mines in individual terms, do not always generate profit, thus, a policy of establishing royalties linked to profitability may not be effectual, considering that, faced with the possibility of not making profits, nothing ensures that the State would collect any compensation based on profitability of operations, despite depletion of natural resources.

Some states of Australia adopt criteria that link taxation of part of the profits of mining companies as a royalty for use of the mineral resources, charging both *ad valorem* royalties and specific royalties, forming a hybrid base for establishing financial compensation to society for depletion of certain mineral resources.

The fact is that, worldwide, royalties are determined in a myriad of manners. Many are quite direct, while others not. Broad agreement exists, however, that depletion of mineral reserves requires financial compensation to society (Table 5).

**Table 5:** Charging of Mineral royalties (selected countries).

Country	<i>Royalties</i>
South Africa	No
Argentina	Yes
Australia (Western Australia)	Yes
Bolivia	Yes
Brazil	Yes
Canada (Ontario)	Yes
Chile	No
China	Yes
Ivory Coast	Yes
Ecuador	Yes
United States (Colorado)	Yes
The Philippines	Yes
Ghana	Yes
Guyana	Yes
Indonesia	Yes
Kazakhstan	Yes
Mexico	No
Papua New Guinea	No
Peru	No
Poland	Yes
Surinam	Yes
Tanzania	Yes

Source: Andrews-Speed (2000); Mackenzie (1998); Otto (2000, 2001); Otto; Cordes (2002); Parsons (1998, 2000).

Research by Kumar (1991) indicates that, from the government point of view, the *ad valorem* royalty, compared to other forms of *royalties*, meets the criteria of stability in revenue generation, ease of collection, and ability to be collected quickly, depending on the form of collection, and can meet demands for progressiveness and distributive justice. Comparisons show, however, that the *ad valorem* royalty fails to meet the criterion of neutrality, which can only be met by a royalty collected as a percentage on profit (Table 6).

**Table 6:** Evaluation of fiscal instruments using governmental criteria.

	Stability in Revenue Generation	Progressiveness	Ease of Collection	Ability to be collected quickly	Distributive Justice	Neutrality
<b>1. Royalty</b>						
Fixed amount per ton	Y	N	Y	Y	P	N
Percentage of production value	Y	P	Y	Y	P	N
<b>2. Income tax</b>	P	P	P	P	Y	P
<b>Accelerated Depreciation of Capital</b>	N	N	P	N	Y	N
Depletion	N	N	N	N	P	N
Other types of depreciation	N	N	P	N	P	N
Retroactive compensation of fiscal losses or future gains	N	N	P	N	Y	Y
<b>3. Additional Taxes (based on profitability)</b>	N	Y	N	P	Y	Y
<b>4. Taxes on dividends or profit sharing</b>	P	P	Y	P	Y	Y
Y	Satisfies interests	N	Does not satisfy	P	Perhaps it satisfies	

Source: Kumar (1991).

The same study by Kumar (1991) indicates, however, that in terms of income decentralization, which is very important to potentially link mining and formation of public funds to drive regional development processes, an *ad valorem* royalty is appropriate for the purpose of income decentralization for federal, state and possibly municipal levels; whereas a royalty charged as a percentage of profit, in terms of decentralization, would be appropriate to the federal level, and might be adequate in terms of fiscal decentralization at the state level, but would be hardly appropriate at the municipal level (Table 7).

**Table 7:** Taxation and its appropriation in terms of fiscal decentralization.

Type of tax	Governmental Level				
	National	State	Municipal		
Tax charged on income or profit	A	P	X		
Tax charged on importation	A	X	X		
Tax charged on exportation	A	X	X		
<i>Royalty</i> (a percentage charge on profits)	A	P	X		
<i>Royalty</i> (a percentage of production value)	A	A	P		
<i>Royalty</i> (fixed value per ton)	A	A	A		
Licensing fees	A	A	A		
Land use fees	A	A	A		
Taxes charged on dividends, profit sharing and international money transfers	A	X	X		
Value Added Tax	A	P	X		
Taxes on consumption and sales	A	P	P		
Customs Taxes (seals)	A	A	A		
Taxes on property (based on value of the mine)	A	A	A		
Payroll taxes	A	P	X		
Surcharges	A	A	A		
Taxes based on use of infrastructure	A	A	A		
A	Appropriate	P	Possibly appropriate	X	Not appropriate

Source: Kumar (1991).

#### 4- FINANCIAL COMPENSATION FOR MINING IN BRAZIL

In Brazil, specific fiscal characteristics of mining were expressly recognized in the national legal framework through the establishment of the Unified Mineral Tax (IUM), enshrined in the 1946 Constitution, although it only came into force in 1964, after being codified by specific legislation. The IUM was charged on mining, circulation, distribution and consumption of minerals in the country. The tax could not be charged more than once, that is, only one of these operations was taxed. Moreover, no other tax was applicable to these operations. The IUM was, however, similar to an ad valorem royalty.

Given the difficulty in defining taxable value when there is high degree of variation in the value of the mineral, when this value was very low or when the mineral was transferred between associated companies, guidelines needed to be established, so as to define the prices of the minerals on which the IUM would incur. In the case of the mineral goods whose prices, for purpose of IUM calculation, were determined by government agencies, the tax became similar to a specific royalty.

The basic IUM rate on mineral substances for the domestic market was 15% of the base calculation (generally sales price). When exported, the general rate was 4%. There were special rates for noble metals, precious stones, semiprecious polished stones and carbonates, including those for export; in this case the rate was 1%. In the case of iron ore and manganese for the overseas market, the rate was 7.5%.

The 1988 Federal Constitution adopted the principle that mineral resources are the property of the Union and their use is a privilege that requires compensation by the party that has exclusive usage rights to these resources. Following this principle, the constitution extinguished the IUM, and placed minerals in the field of ICMS taxation and a created financial compensation and profit sharing in results from mining mineral resources.

The codification of article 20 of the Constitution, pursuant to laws nos.7990 of 1989, 8001 of 1990, and Decree no.01/91, established Financial Compensation for Use of Mineral Resources (CFEM). Effectively speaking, as it was codified, this is an ad valorem royalty. Thus, currently, financial compensation due to Brazilian society for use of its mineral assets is achieved through an ad valorem royalty, which is what the CFEM effectively is.

In practice, however, over the last few decades, the proportion of the compensation due for use of the mineral resources was reduced, in financial terms, related to the sales price of mineral ore. This is due to, among other factors, the establishment in current legislation of rates that are much lower than those that were in effect with the IUM. Furthermore, legislation did not clearly determine the effective calculation base and point of incidence of CFEM, which resulted in a significant number of lawsuits.

In this case, comparing CFEM rates with royalties charged in other countries, one sees that Brazil charges much less than amounts collected on minerals in other countries.

These differences in terms of rates are significant. A clear example of this are two mineral products, iron ore and bauxite, which were respectively responsible for 46.79% e 9.15% of the CFEM collected from January 1996 to December 2002. These only represented, therefore, roughly 56% of the R\$ 722.3 million Reais (in historic values) of CFEM collected during the period.

In the case of iron ore, Brazil is one of the largest producers worldwide, and in 2001 produced 208 million tons, while Australia produced, during the same period, 180 million tons of ore. In Brazil, the CFEM rate is 2% on net income from sale of this mineral product, which allows exemption on transportation and insurance. On the other hand, the ad valorem royalty charged on sales from mining companies installed in Australia at a much higher rate. In the case of Western Australia, where companies responsible for 97% of ore mining in the country are located, the base royalty rate is 5% on the sale price of iron ore concentrates and fines, reaching 7.5% of the sales value of this ore. Here is a case regarding royalties paid by companies that sell their products on the global market, like the Brazilian companies, yet compensate the national societies for depletion of its mineral resources in an unequal way. The companies installed in Brazil and those installed in Australia are responsible for approximately 62% of iron ore and its concentrates exported throughout the world. The companies based in Australia in 2000 were responsible for exporting 157.2 million tons of iron ore and its concentrates, while the companies in operation in Brazil for 156.8 million tons.

Regarding bauxite production, the largest global producers are Australia, which in 2000, was responsible for production of 53.8 million tons, and Guinea, responsible for 17.95 million tons, followed by Brazil, which in the same year, was the third largest producer worldwide, with 13.22 million tons, and Jamaica which produced 11.12 million tons. Production of these 4 countries is responsible for more than 70% of the volume of bauxite mined globally.

In Brazil, financial compensation for bauxite mining is 3% and is charged on the net sales income from the mineral product, a royalty much lower than that charged to companies that mine bauxite in Australia.

As cited earlier, legislation regarding royalties in Australia varies from state to state. Bauxite mining there is concentrated in 2 states and one territory: Queensland, Western Australia and the Northern Territory. In the former, the royalty rate paid on exported bauxite is 10% of the *free on board* (FOB) sales value, that is, the price of the good on board the ship without any discount; in the case of domestic sales, the royalty rate is 5% of the sale price. In the second state, royalties for bauxite depletion are 7.5% of the sales price (FOB) if the product is destined for export; when the product is destined to the domestic market, the company is allowed to deduct transportation costs, but the 7.5% tax rate is maintained. In the Northern Territory, royalties are 18% on sales value, however, the mining companies are permitted to deduct operational and mining costs.

In relation to Guinea, the second largest producer of bauxite, where the national state legislates on and benefits from royalties, the rates are 10% on the sales price (FOB); but this rate may be cut in half, becoming 5% in the case of sales of alumina.

In the case of Jamaica, another large worldwide producer, the *royalty* charged there is specific, that is, it consists of payment of a fixed amount, which in the case of bauxite is US\$ 0.50 (fifty cents of one US dollar) per ton of exported bauxite; in the case of exportation of alumina and not bauxite, the value is the same, but is only charged on the volume of bauxite, which presumably was produced in order to generate the alumina.

Here, there is apparently a logic which has repercussions in the realm of financial compensation that society receives and is linked to organization of the State and the institutions that legislate and benefit from royalties. In the case of Australia, wherever states or territories are responsible to legislate on compensation for depletion of mineral resources, as well as to collect and spend royalty revenues, taxation tends to be higher. In Guinea and Jamaica, the National State is responsible for legislation, collection and investment of royalties. In this case there is also an interest in establishing higher compensation for use of mineral resources.

Contrastingly, in the case of Brazil, where responsibility for legislation is with the national government, and investment of the revenues occurs at the state and local levels, there is a tendency to

lower royalty rates. Thus, due to a phenomenon of unequal appropriation of political power (BOSIER, 1996), a compensation policy was established in Brazil for mining that on one hand harms state entities (especially municipalities) where the majority of mines are concentrated, and on the other hand, addresses interests of other states in the union. It is an institutional reality where the mining compensation policy apparently reflects all of the states' interests, but in fact represents that only of the most powerful.

When observing the cost structure linked to adding value to bauxite in the Trombetas River region, one notes that costs related to royalties represent only 2.65% of the total income of Mineração Rio do Norte (MRN) and that, in 2003, operational costs represented 43.71% of income, enabling the company to achieve a net profit corresponding to 39.34% of gross sales. In these terms, comparing royalty rates charged by the largest worldwide exporters of bauxite is compatible neither with the companies' profitability level, nor with competitiveness of the product internationally (Table 8).

**Table 8:** Details of income, expenses and profits of Mineração Rio do Norte in 2003.

Items	US \$ Million Dollars	%	US \$/t
Gross income from sales in 2003	288.99	100.00	20.50
Taxes charged on sales	-15.79	-5.47	-1.12
CFEM ( <i>royalties</i> )	-7.66	-2.65	-0.54
Cost of products sold	-126.31	-43.71	-8.96
Gross profit	139.22	48.18	9.87
Operational expenses	-8.38	-2.90	-0.59
Operational profit	130.84	45.28	9.28
Non-operational expenses	-1.91	-0.66	-0.14
Before tax profit	128.93	44.61	9.14
Income tax	-15.25	-5.28	-1.08
Net profit for period	113.68	39.34	8.06

Source: Prepared by author, based on MRN annual report.

Conversion rate: R\$ 1.00 equivalent to US\$ 0.34965.



When costs involved in adding value to iron ore in Carajás are considered, one notes that financial compensation for mining iron ore in Carajás is equal to 1.80% of sales value of ore at the Port of Itaqui in São Luis, and operational costs involved in commoditization of this ore represent 35% of the average sales price (Table 9).

**Table 9:** Estimate of operational costs involved, in average terms, in adding of value to iron ore in Carajás in 2003.

Item	US \$		%
	Million Dollars	US \$/t	
Gross amount from sales of iron ore from Carajás	748.00	16.40	100.00
Mining and maintenance	29.78	0.65	3.98
Processing	27.21	0.60	3.64
CFEM ( <i>royalties</i> )	13.44	1.80	1.80
Railway transport	81.35	1.78	10.88
Moving and loading of cargo	43.87	0.96	5.87
Average operational costs of iron ore loaded at the Itaqui port	264.31	5.78	35.34

Source: Prepared by author, based on data provided by employees from the CVRD Directorate of Ferrous Minerals.

In light of the formation of iron ore costs as previously cited, one can also state there is no obstacle in microeconomic terms from charging royalties on iron mining equal to those paid by mining companies that operate in other countries and are responsible for supplying the world market. Even when freight costs to transoceanic markets are considered, it is viable to maintain competitiveness and profitability in mining Brazilian ore if royalties were to be increased.

## FINAL CONSIDERATIONS

Royalties in Brazil as financial compensation for mining are the lowest among the major exporting countries of mineral goods, which from an analytical point of view, is largely due to unequal appropriation of political power in Brazil rather than any economic restriction.

The fact that public authority is the one responsible for defining the amount of taxation to be incurred in activities that add value to mineral resources and the possible use of this

financial compensation to stimulate local development processes is of great relevance, in that it establishes the of said compensation and determines its intra-national distribution. It is a question of huge importance, since depletion of more accessible mineral reserves has led to new mines being located in locations more distant from consumer centers. Otto (2001) argues, with reason, that globally speaking, the location of mines in areas distant from urban centers has impacts on policies that could financially compensate populations reside near the mineral reserves before they are mined. As mines are frequently located in regions with low population density and as a consequence, small electoral constituency, there is little or no political incentive to direct funds generated from mining activities to the affected communities and even to the local governments. In addition to being politically weak and with inexpressive constituency, organized civil society in regions more distant from large urban centers is fragile.

Thus, in the case of Brazilian Amazonia, establishment of a tax policy (*lato sensu*) linked to developing the region is hindered or even blocked by unequal appropriation of political power. This reduces revenue sources to states in the region that would be allocated to supporting developmental processes based on establishment of competitive advantages that are socially-created and integrated to sustainable use of the natural resources of the region.

If, on one hand, tax waivers can benefit specific mining companies and, on behalf of export efforts, in certain cases improve competitiveness on international markets; on the other, this waiver, especially when considered that these exemptions are contractually-based, could be used by public authorities as an instrument to stimulate and induce mining companies to adopt behavior that would stimulate endogenous development processes, through technical cooperation between companies, establishment of technological knowledge transfer, formation of subcontracting chains that favor local development etc.

In Brazilian Amazonia, however, these possibilities are not explored, and there are no political policies that associate granting of fiscal benefits to adoption of behavior by the mining companies that could result in stimulating local and regional development. In fact, the offer of fiscal benefits is linked to interests of the more developed regions; in some of them, hierarchical relations and

unequal appropriation of political power are used to create public policies that represent their interests. In the case of mining, its capacity to generate high and sustained export volumes, enabling surplus trade balances, which attends the interests of the more developed regions. These results, however, are not necessarily aligned with strengthening dynamics that favor local and regional development. Within this context, fiscal benefits are established much more for interests outside the region, than, effectively, as political public policies focused on development of the region.

Tax policies also show that regional society has limited power to avail itself of the specificities of adding value to mineral resources. This is because mining activities, unlike other economic activities, must be conducted in the area where the mineral occurs – often called locational rigidity – and this could result in establishing social dynamics that enable increasing taxes from the adding of value to these reserves. In particular, an increase in the CFEM (*royalties*), which could support an increase without harming competitiveness in these markets, due to characteristics of these mines and world markets. This is not, however, what happens.

Furthermore, locational rigidity characterized by mining is not utilized to increase taxation on these specific characteristics of mining activities. On the other hand, the flexibility that companies have in relation to where they can install their industrial complexes where later stages of transformation of mineral goods takes place is quite skillfully used, so that the national and state governments reward them by reducing taxes to those companies that install their facilities in their territories. There are, therefore, asymmetries in the negotiations that involve, on one hand, locational rigidity for mining and primary processing, and, on the other hand, flexibility for later stages of ore processing.

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