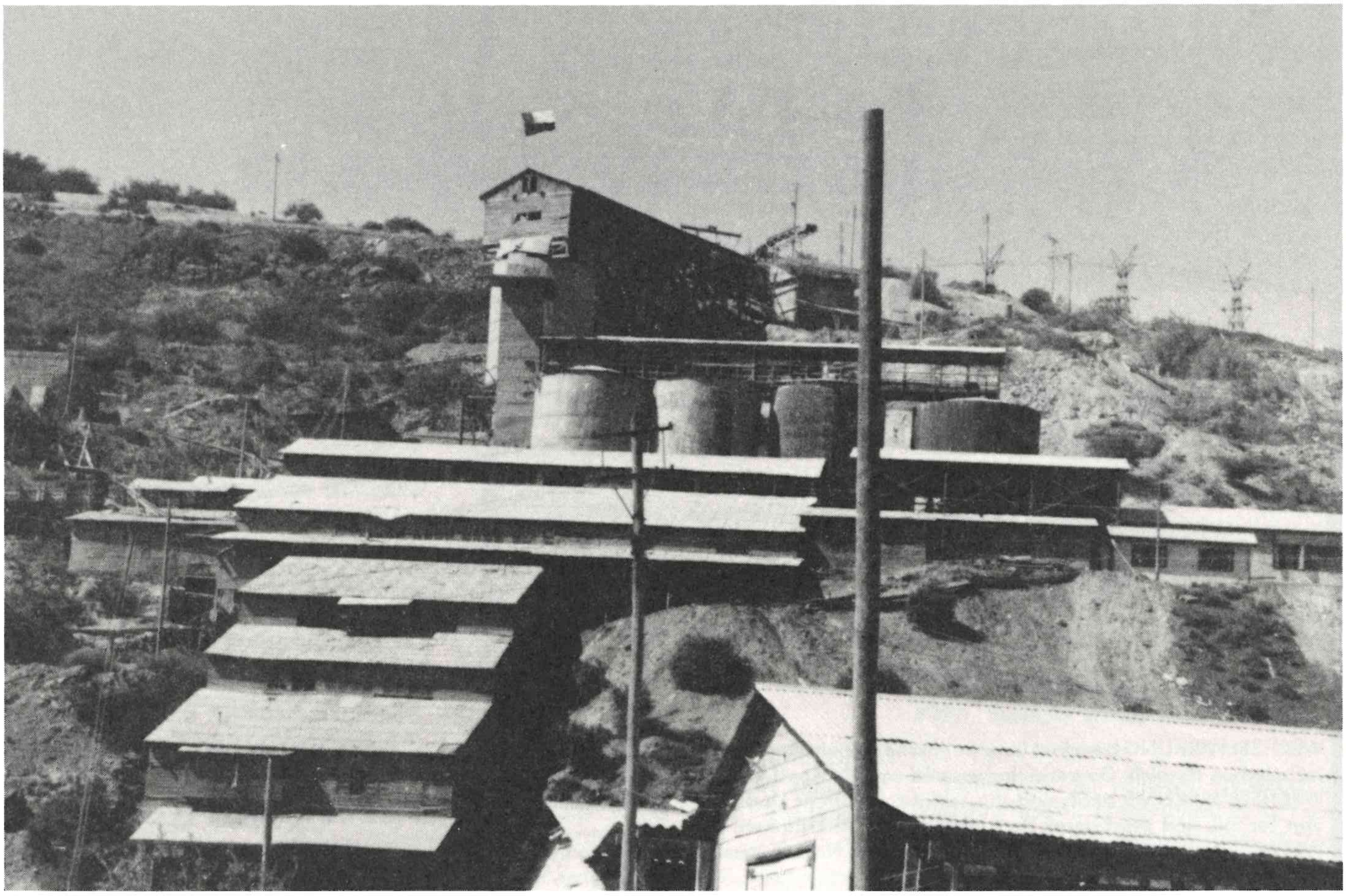
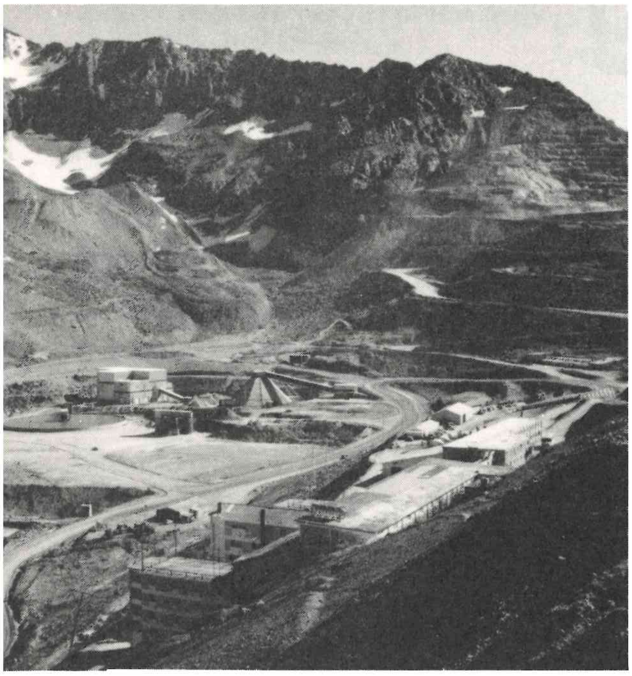
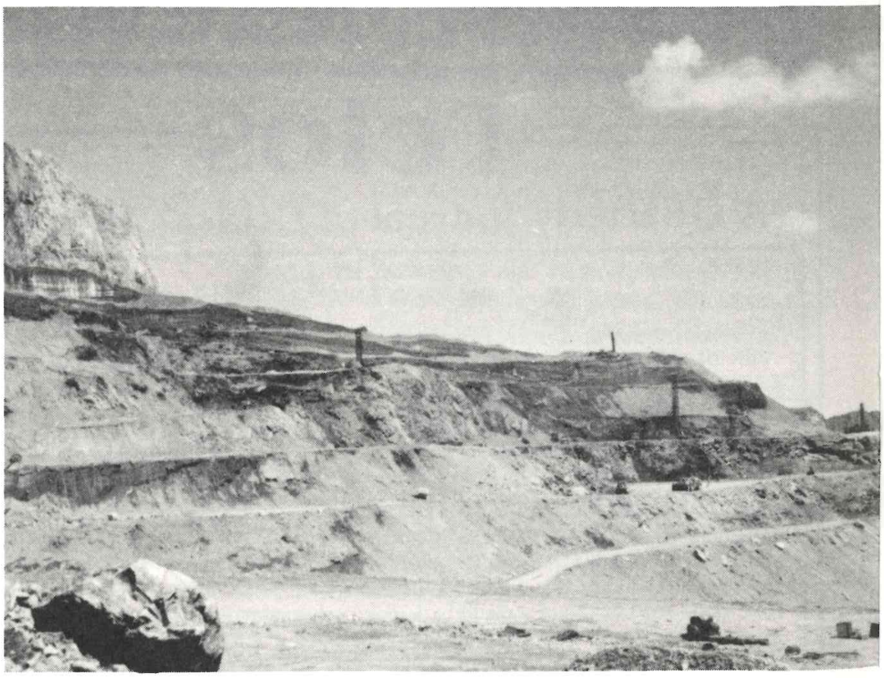
Cerro Negro Mine, concentration plant. 3 500 t Cu/year (top), photo from 1984. Los Bronces mine, concentration plant, of Exxon's Compania Minera Disputada. 43 000 t/year (Cu contained) 1983, (below left).

"Sur-sur" Mine, Andina Division of Codelco. 4 000 m of altitude, ore is mined 8 months a year, 1984 (below right).







WORLD ECONOMY

The mining concession from an economic perspective

By José Luis Mardones
and Isabel Marshall

**Mining concessions is one instrument through which a host country can influence the activities of the mining TNCs.
José Luis Mardones and Isabel Marshall of the Chilean Copper Commission evaluates this system from different standpoints.**

The Chilean Copper Commission is a decentralized organization, depending from the Ministry of Mining, whose aims are to formulate policies for the development of the copper sector, to give technical advise to the Government and to carry out supervisory functions related to investment, production, manufacture, and trade of copper and its by-products.

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From the point of view of economic analysis, a system of private property of mines or one of mining concession can be evaluated from three standpoints.

The first one deals with *the fraction of economic surplus that the State may claim in one case or another.* The second relates to *the attainment of an optimal path of expansion of the mining sector, from the country's point of view.* Finally, an aspect related to the preceding issues but that should be pointed out specifically because of the importance attached to it, is the problem of *the risk involved in either regime.*

The following questions derive from these points:

- Who is the owner of the natural resource, and therefore, to whom do the "economic rents" generated from the exploitation of this resource belong?
- Does the firm exploiting the resource have a right to deduct a depletion allowance?
- Under what system are there better instruments to assure that the timing and path of exploitation of the resource is nearer to the optimal one, from the country's point of view?
- How does one system or the other affect the risk perceived by the investor in mining activities?

These topics will be briefly addressed here.

The concept of economic rent

It is important to determine who is the owner of the mining resource since "economic rents" linked to the quality of the resource are produced in this sector of the economy.

Actually, the geographical distribution of resources in the subsoil of the earth is very unequal as to quantities and qualities, and it is not possible to supply the whole demand just with high quality and low cost deposits.

This means that deposits with different sizes, grades, wheather conditions, impurities, distance to ports, and so on are simultaneously operating and supplying the market. The equilibrium market price should be at the same level as the costs of the last mine required to supply the markets, i e, of the highest cost mine in operation. If such a mine just covers its costs, after payments to all productive factors on a long term basis, that means other higher quality deposits will have profits in excess of payments to all productive factors. These surpluses are linked to the better quality of the resource and are called "Ricardian rents" or "differential rents". If demand was fully supplied with deposits of the same quality, and therefore of the same costs, these rents would not exist.

Ricardian rents are only obtained from higher quality mines. In the case of natural resources there may exist other rents and quasi-rents that are not linked to the quality of the resource. For instance, there are monopolistic quasi-rents, and rents derived from the fact that a resource is not renewable (Hotelling rents), but Ricardian rents are generally the most important.

Differential rents do not exist in other economic sectors, such as the manufacturing one, if we take a long term approach. In fact, the existence of rents produced by technological innovation in one particular firm of an industry, for instance, induces lower cost companies to expand their productive capacity. This is possible due to the fact that unlike the copper mining sector, in which higher quality mineral reserves are limited and are insufficient to supply the whole market, in the industrial sector there are no fixed factors in the long term. In this case capital is renewable and could be expanded according to the industry's requirements. With the expansion of production in lower cost firms, those of higher costs are displaced from the market. When the market price falls to the level of minimal long term medium cost of those units with improved technology, "differential rents" will disappear.

Thus, there may be differences among

firms that may originate economic rents: different managerial capacity, occasional incomes by unexpected price rises, monopolistic rents if competition is restricted and the market is not regulated, and so on. But competition within the markets tends to eliminate these rents in the long term.

With this brief explanation, we may conclude that in natural resource exploitation, the deposits of comparatively better quality, and accordingly of lower costs, have an associated economic rent, which is the difference between the selling price and the production costs plus the payment for invested capital at a certain rate of profitability. This difference is related to the quality of the resource and not to the capital required to exploit the mine. Because of the fact that the magnitude of economic rents depends on prices and costs, it is difficult to predict accurately its size. This is specially so if we take into account the uncertainty of prices within the copper market, and of costs before the completion of exploration and the start up of the project.

Ownership of the resources

Nevertheless, if economic rent is linked to the quality of the resource, the one who receives such rents should be the owner of the resource. In the Chilean constitutional regime, the State is the owner of the subsoil. In this sense, it is up to the State to set the appropriate policies in order to obtain at least a given fraction of the rents coming from those resources.

In most countries the State claims ownership of the subsoil. Additionally, the United Nations adopted the well-known resolution of permanent sovereignty of the States upon the natural resources. The exceptions, like the United States, may have historical explanations. Some authors think the issue of sovereignty was not a matter of concern in that country because foreign companies did not participate in the exploitation of the subsoil.

Sharing rents

The Government may capture economic rents by means of different methods. One of them is to participate directly in the exploitation of a resource through a national corporation.

Whenever deposits are operated by private companies – usually transnationals – diverse formulas aiming at capturing these rents are in force in different parts of the world. These formulas are more developed for oil – due to the great magnitude of rents in this case – gold, diamond, but also in other mineral resources.

One of these formulas is based on *taxes*, and its goal is capturing on behalf of the State part of the differential rents and at the same time allowing the investor to get the necessary rate of return over his capital to encourage the exploitation of the mine.

The specific mode of application of this tax may be through bidding the mining rights over the deposit, the imposition of an additional tax on profits that exceed a given rate of return, taxes upon capital gains or specific taxation systems designed for each separate deposit.

All of them have advantages and disadvantages. Each one may be proper to capture rents but may have different difficulties. The bidding system has to cope with uncertainty over future values of prices and costs, necessary to calculate the net present value of the deposit. The taxation of the "economic rent" has the inconvenience that it compels to control transfer prices. Specific taxation rules may be very difficult or costly to administrate.

Schemes of this sort are in use in Papua New Guinea (Bougainville Copper); South Africa (gold); Canada; Jamaica (bauxite); Indonesia and Peru (oil , "product sharing agreements").

The main restriction is that administrative costs of the taxation system plus its inconveniences be less than its benefits. Of course, there should be enough incentives for developing the deposit, probably through rewarding the discoverer and the producer with part of the differential rents. In terms of efficiency the tax must be as neutral as possible and should only be applied to those deposits having a yield much higher than the normal rates of return within the business. More so, these surpluses, linked to the high quality of the resource, should be shared with the discoverer and the one who exploits it.

Since mining is a highly risky business, it is necessary that the design of such a tax should include a premium to the discoverer, in order to encourage exploration. This can be accomplished through sharing the differential rents between the discoverer and the State. If this is not done, the State would have to undertake exploration entirely since there would be no private explorer interested in doing it.

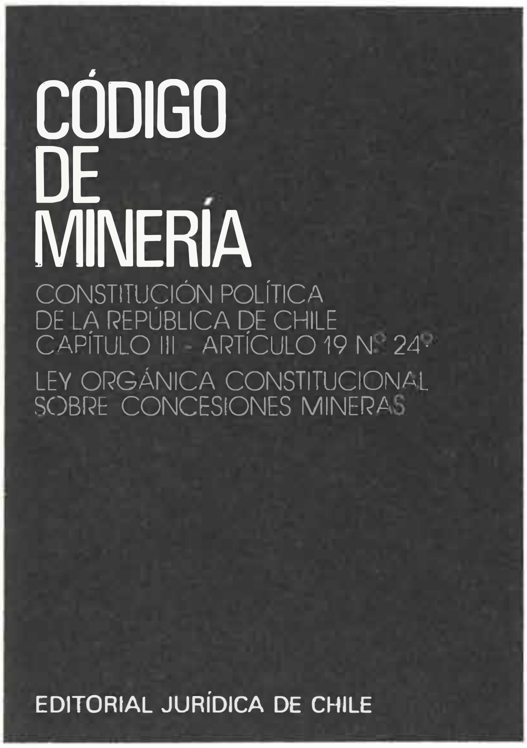
When differential rents are present, the general tax of about 49 per cent is able to capture part of them, but nothing indicates that this is the proper proportion. What we are talking about is a surtax applied on differential rents, and calculated after the application of general taxes. Differential rents are measured after considering a proper or "normal" rate of return (which should include a premium for risk) over invested capital.

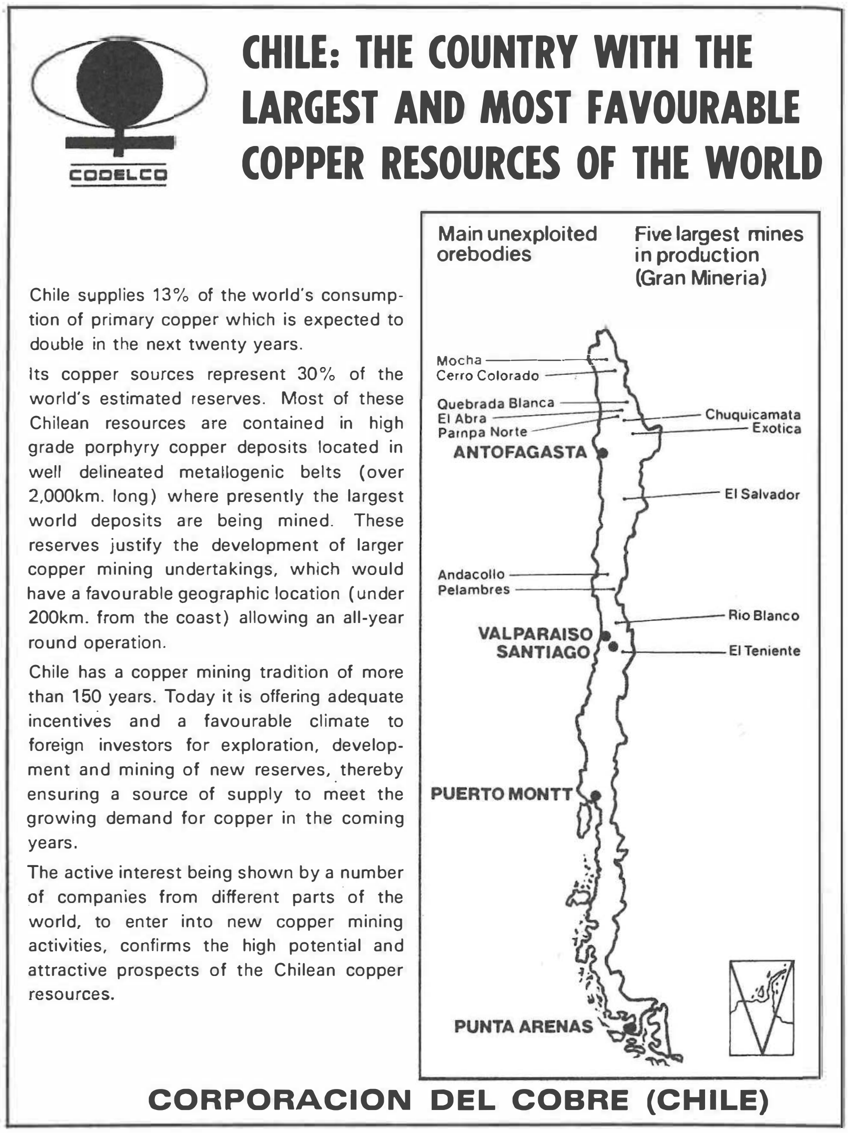
It is worth noting that if the Government does not capture differential rents, it is in fact granting a subsidy to private investors, which is not required to encourage them to invest.

If a tax on differential rents or on capital gains is enacted, the market value of the deposit adjusts downwards, because the payment of this tax represents a charge against the present value of expected benefits.

Even though taxes of this kind do not depend crucially on proprietary rights, whether they be private ownership or a concession regime, it is clearly more coherent with the latter because it establishes that the resource belongs to the State and consequently, it is pertinent for the State to claim the corresponding income.

Advertisement by Codelco in Mining Annual Review 1976 (right) and the cover of the new Chilean Mining Code of 1983. The official English translation of the law on mining concessions (law no 18.097) was published in International Legal Materials.





Depletion allowance

The regime of private ownership of mines is coherent with the depletion allowance system. If the deposit is of private ownership, it may be considered part of a fixed asset and therefore the right to a depletion allowance could be claimed as long as reserves are being used. This would mean an annual deduction from the taxable base in the balance sheet. Thus, the taxation is reduced and consequently the participation of the State is also reduced.

On the other hand, if there is a concession system the resource belongs to the State and therefore, there would be no bases to claim a deduction for depreciation of the mineral stock.

Although the legislation does not include this deduction, a system of ownership would give a better justification to ask for a reform that did include it.

Paralization of the subsoil

It is possible for an investor to have different interests from those of the State as to the proper time to exploit a deposit, because of long term strategic supply considerations, exploitation priorities among different concessions in the world, or participation in competing industries, whether they are of copper or substitutes.

The system of mining royalties, which is coherent with the concession system, might allow a regulation of this situation. To a certain extent, if it were possible to gradually raise the value of mining royalties while the deposit is not in operation, this would encourage to speed up the production phase or to sell the concession to someone who is interested in developing the mine.

Risk

It is important to consider the risk perceived by the investor under one system or the other relating to the assurances given by each one. The greater the perceived risk the higher the expected rate of return the investor will need in order to decide carrying out the project. So there would be mines that eventually would not be operated even if it was convenient to do so under conditions of less risk.

Actually a well conceived concession system should not imply greater risk than the property system. In most countries the system used is that of concessions, and this neither prevents investment nor increases risks.

The stability of either regime – ownership or concession – and therefore the inherent risks of each one, depends on the political attitude of the host country towards foreign investment. This in turn is influenced, as some authors have held, by the appropriateness and the coherence of the Investment Agreement's terms with the worldwide tendency of these terms, as well as the degree of harmony in the relationship between the parties involved. ■