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THE ROLE OF STATE OWNED ENTERPRISES IN THE
INTERNATIONAL METAL MINING INDUSTRY

by

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1. Introduction

The purpose of this paper is to explore the implications for the international mineral markets of the fast growth of state ownership in the mineral industries over the past two decades. The issues in focus of the present investigation include the change in market structure and the shifts in relative competitive position of different suppliers, resulting from the proliferation of state owned enterprises.

The paper is concerned with state owned mineral enterprises in the market economy countries only¹. State ownership in all industries is a matter of course in the Socialist countries and has been so ever since Socialism was established.

There is a heavy emphasis through the following account on the developing countries. This is because the rapid growth of state ownership in the mineral industries worldwide has been predominantly due to the widespread nationalizations that occurred in these countries after the breakup of the colonial empires.

The analysis proceeds as follows. Section 2 analyzes the motivations and describes the modes for establishing state ownership positions in the mineral industries. Section 3 assesses the growth and current size of the state mineral universe, after first considering the methodological and definitional issues involved. The prospects for further growth of state ownership in the mineral industries are also considered. In section 4, the features which distinguish state owned mineral enterprises from private ones are identified, and the market impact from the introduction of the new agents on the supply side is analyzed. Section 5, finally, is concerned with the implications for the private mineral industry from the presence of a large and increasingly mature state owned enterprise universe.

2. Why state ownership in the mineral industries?

The mineral sector throughout the world has been a favorite area for government intervention in a variety of forms, including the taking up of direct equity positions. The authorities' desire to be

¹The analysis draws heavily on the research underlying my book State Mineral Enterprises, An Investigation into Their Impact on International Mineral Markets, Resources for the Future, Washington DC 1985.

involved and to control has a variety of explanations. First, the widespread perception of mineral wealth as a national patrimony has often been used to sanction public involvement, for instance to prevent private interests from profiteering, or to assure adequate mineral supplies for future generations. Second, the inability to move mineral deposits exploited by mining firms facilitates far-reaching public intervention of such exploitation without a risk that the activity moves beyond the government's reach. Third, the frequent generation of high rents in mineral endeavors, coupled with the difficulty to appropriate such rents through fiscal measures, provides the temptation for a greater degree of public involvement. And fourth, the extraction and processing of minerals is often regarded as strategically important, either because of the very large size of many mineral ventures, or because such activities assure a domestic supply of key inputs into manufacturing, including the defense industries.

Arguments such as these explain many of the public ownership positions in mineral industries in the industrialized market economies. The more important ones include all stages of aluminum production in France, aluminum smelting in Germany, Italy, Norway and Spain, copper mining through refining in Finland, iron ore production in France and Sweden, and steel manufacturing in several West European countries. The modes for establishing these ownership positions varied. In a few cases they resulted from confiscation of enemy property at the end of the second world war. In some instances, the state acquired its ownership stake by bailing out bankrupt private enterprise. In others, the government purchased the equity at a price agreed through negotiations (Swedish iron ore), or determined unilaterally through a government decree (French aluminum).

However, a major proportion of the state owned mineral enterprises outside the Socialist economies is found in the developing countries. Although the arguments enumerated above are certainly valid in explaining the existence of state ownership in the developing country group, an additional perspective is required for a fuller understanding of the emergence and growth of the publicly owned mineral sector in the third world.

The 1960s and 1970s involved a historically unique economic emancipation process for a majority of the developing countries, following the severance of formal or informal colonial bonds. With improving administrative, technical and managerial capabilities in the post-colonial period, the ambitions and abilities of the authorities to promote development through control and direction of the national economy were expanded. The great importance of the mineral sector in many cases, its predominantly foreign ownership and secluded enclave character vis-a-vis the national economy, made it a major target for public policy initiatives.

These initiatives took a variety of forms. The ultimate and most far-reaching measure in the developing countries heavily dependent on mineral exports was to nationalize the industry, in part or

completely. The motivation to nationalize was usually based on the view that other intervention measures, like taxation or specific regulation pertaining to e.g. investment, employment or exports, were inadequate, and that only direct equity ownership could provide the means for effective control over this key industry. The practice of compensation payments to previous owners varied, from none at all, to sums which might appear as adequate to impartial observers. However, the former owners invariably complained about the compensation received.

For reasons to be explored below, the urge to nationalize appears to have lost its force in the present decade. This underlines the historical uniqueness of the very fast growth of state ownership during the preceding two decades.

3. State ownership in the mineral industries quantified

Quantification of the state mineral enterprise universe raises some intricate problems. First, what criteria to use in defining state mineral enterprises. A high degree of government control and a high share of public equity ownership are two possible criteria for including mineral firms into this category. Qualitative discussions often assume a close relationship between degree of public ownership and public control. This is not always so. Very heavy public involvement can sometimes be based on quite small government shareholding, while in other cases, the government may remain uninterested in exercising its power to control despite a majority equity holding.

The degree of government control is probably a more relevant criterion for defining state enterprise than the extent of public equity ownership, given this paper's concern about changes in market structure and competitive strength brought about by the growth of state enterprising. Any systematic differences between private and public mineral firms are more likely to depend on control than on formal ownership. As noted, ownership can be passive. Control, on the other hand, implies active involvement.

The use of government control to define and quantify state mineral enterprise raises formidable difficulties, however. To determine the extent of such control would require in depth studies of individual mineral enterprises, which is hardly practicable in an effort of global quantification.

Defining state mineral enterprise by the equity ownership criterion, though not entirely relevant for the purpose at hand, is infinitely simpler. Even when this classification criterion is employed, some tricky issues must be resolved. For instance, table 1 below provides three alternative measures of the state mineral enterprise universe. The least restrictive includes in the state owned category all firms in which public bodies hold 5 % or more of total equity. The most restrictive measure, in contrast, classifies as state enterprises only the ones in which government has a majority equity holding. The one in between takes state owned

capacity to be proportional to the government's equity holding in each firm.

The division of enterprises into state and private portions according to the respective equity holdings will be employed in the following assessments of the size of the state owned universe. Though it is convenient for quantification purposes, the measure has the disadvantage of impeding clear-cut identification of individual enterprises as either state or private.

Table 1, based on detailed analyses by company, presents an overview of state ownership at different stages of aluminum and copper production and in iron ore. In addition to providing Western World² totals, the table also details the prevalence of state enterprise in the developing countries.

In the early 1980s, state enterprise, measured as capacity proportional to government equity holdings, represented 45 % of total capacity in bauxite and 41 % in copper mining. The figures were substantially lower at the further processing stages of bauxite and copper ores. In iron ore, the state owned proportion was more than 55 %. Less detailed analyses for some other metal minerals suggest Western World state owned shares of about 70 % in cobalt, more than 30 % in tin, 20-25 % in lead and zinc, roughly 17 % in chromium and 15 % in nickel and molybdenum³.

In all cases the state owned shares are substantially higher when only the developing countries are considered. In fact, the variation in the the Western World state owned share is strongly correlated with the LDCs share of each metal in total Western World output.

Despite their limitations, the above data indicate that the public ownership involvement in Western World mineral industries is very substantial. They also point to a very considerable concentration of state enterprises to the developing countries. An attempt to aggregate by assigning weights to the respective minerals according to output value suggests that in the early 1980s roughly one third of Western World mineral industry, and about one half of the mineral production capacity located in the developing countries was state owned.

Attempts to track the growth of state enterprise over time present tricky problems, but whatever data are available suggest that the expansion was explosive in the 1960s and 1970s. Public ownership was relatively insignificant in the early 1950s. The present importance of public engagements in the mineral sector has been

²Western world is defined to include the entire world with the exception of the Socialist countries of Eastern Europe, Asia and Cuba.

³M Radetzki, State Mineral Enterprises, op. cit.

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Table 1. GOVERNMENT OWNERSHIP POSITIONS IN THREE MAJOR MINERAL INDUSTRIES, 1981

	Aluminum (actual weight) ^a			Copper (metal content)			Iron ore (actual weight) ^b
	Mining	Refining	Smelting	Mining	Smelting	Refining	
<u>Western World</u>							
Total capacity (000 tons)	92,500	30,790	14,040	7,820	8,780	9,120	543,000
Percent of capacity with significant govt. ownership ^c	45.3	24.2	22.8	40.5	30.6	25.9	55.6
Percent of equity held by government	27.8	15.1	18.5	32.4	26.1	21.6	40.0
Percent of capacity with majority govt. ownership	23.2	13.2	19.4	34.7	29.7	24.3	n.a.
<u>Developing countries</u>							
Total capacity (000 tons)	54,000	6,530	2,190	4,120	3,340	2,580	216,900
Percent of capacity with significant govt. ownership ^c	71.1	54.9	60.3	73.0	75.5	82.6	94.7
Percent of equity held by government	41.1	21.1	44.7	57.8	64.0	67.6	61.8
Percent of capacity with majority govt. ownership	33.3	12.3	45.6	62.0	72.9	77.0	n.a.

Source: M. Radetzki, State Mineral Enterprises, Resources for the Future, Washington, D.C., 1985^a Figures for aluminum are for 1980.^b Figures for iron ore are based on production and not on capacity.^c Defined as 5 percent and upwards of total equity.

attained primarily through a combination of nationalizations of existing privately owned firms, growth in capacity of existing state owned companies, and substantial government participation in joint ventures with mining multinationals in the development of new capacity.

Several factors suggest that the fast growth phase has now come to an end. The post-colonial push for economic emancipation, which was a major force behind many nationalizations, has been completed in a majority of developing countries by the early 1980s. The most conspicuous foreign ownership positions have already been taken over by the national authorities. Relations between governments in developing countries and multinational mining firms have improved, and amicable joint venture arrangements for the development of new projects have become common. During the 1980s, a worldwide resentment against excessive public involvement in industry has led to many privatizations of state enterprises. Though few, if any, state owned mineral firms have been sold off, the likelihood for a further significant expansion of the state owned share in the mineral industries in industrialized economies or developing countries appears to be small. Prospects for the coming years are for a substantial but relatively static proportion of Western World mineral production to be supplied by an increasingly mature group of state owned enterprises.

4. State mineral enterprises: Distinguishing features and market impact

The ideal situation from an analyst's point of view would be one where a clear-cut distinction could be drawn between the profit maximizing mineral firms on the one hand, and the state owned mineral enterprises, characterized by their pursuit of a different set of goals, on the other. In the real world, the distinction between the two is blurred. Private firms seldom conform to the pure microeconomic paradigm. Especially during the most recent decades, private mineral enterprises in many countries have been increasingly conditioned, by law or convention, to assume many functions other than profit maximization. The characteristics of state owned mineral enterprises appear to range widely between forms quite akin to private corporations at one extreme, and ones where social considerations predominate over concerns with return on capital, at the other.

However, although the line is blurred, there does appear to be a significant difference in goals, characteristics and behavioral patterns between the average private and state owned mineral firm. The following paragraphs try to describe this difference. The statements are based on widespread empirical observation as reflected in the literature, and are supported by common sense and economic logic.

The emphasis is on the state owned mineral firms in developing countries, since this group has experienced the fastest growth and

currently accounts for a dominant share of the total state owned universe in the mineral industry.

Inefficiency of new state owned firms

A transient but very important feature that has characterized a significant proportion of the state mineral enterprise universe during the past 20 years has been a high degree of inefficiency. As noted, the fast growth of the state mineral enterprise universe came about importantly through nationalizations of private foreign investments in developing countries. Nationalizations frequently involved extended and heavy set-up costs. The national firms set up to manage the operations that were taken over from the foreigners, usually had a difficult start. The old owners, dissatisfied with the compensation offered, were often unwilling to provide assistance. The new managers regularly lacked the appropriate experience; yet they had to take on wide-ranging responsibilities long before they had a chance to acquire the necessary expertise.

The result was almost invariably a disruption in operations that reached a maximum soon after takeover, and then gradually subsided over a long period of time. Initially, the inexperienced management was often unable to maintain production at full capacity levels, and the cost of output tended to rise. The ability to undertake investments in new capacity, probably the most complex task faced by managements of mineral firms, usually took the longest time to master.

Empirical evidence suggests a wide variation in the time needed for overcoming the disruptions and inefficiencies due to managerial inexperience after nationalization. Speedy results in this respect appear to be related to the level of economic development of the country, the extent of earlier exposure of the national managers to the problems of the industry, and the ability to strike a constructive arrangement with outside specialists for managerial support and training. Overcoming the loss of efficiency due to inexperience at the time of nationalization took no more than five years in the case of Venezuela's iron ore operations. In Indonesia's tin, more than 20 years were needed to develop a national management cadre of international quality standards, after the industry was taken over from the Dutch in the early 1950s. In Zambia, where the government took a majority holding of the copper industry in 1969, the process has not yet been completed⁴.

As a consequence of the successive nationalizations, a considerable proportion of the state owned mineral enterprises has been operated by inexperienced managements throughout the past two decades. The result has been a lower rate of capacity utilization, a higher level of costs, and a lesser extent of capacity expansion than would have occurred in the absence of state takeovers.

⁴M Radetzki, State Mineral Enterprises, op. cit.

The impact just described is transient. Since the process of nationalizations appears to have come to an end, one can expect that the state mineral enterprises still suffering from managerial inexperience and related inefficiencies, will gradually overcome these predicaments.

Characteristics of mature state owned mineral firms

Other characteristics of state mineral enterprises have a more permanent nature. For instance, these enterprises regularly have a much more diversified goal structure than privately owned firms. In addition to the requirement that a return on capital should be earned, the state enterprises often pursue objectives with regard to employment, regional development or skill creation and technological progress at the national level.

The addition of non-profit objectives to the goals of the state owned firm is bound to involve a cost, and so to result in permanently higher costs of mineral production. Furthermore, the subordination of the profit motive is likely to lessen the pressure on management to minimize costs⁵, especially since a high cost to produce the mineral can always be justified by the pursuit of some social objective. The ensuing inefficiency will tend to increase costs even further.

For the reasons just spelled out, the costs to produce minerals in state owned mineral enterprises will be higher, on average, than in private firms exploiting mineral deposits of a corresponding quality. It should be stressed, however, that the importance of this difference will vary. In those state owned firms where return on capital is the overriding objective, the cost efficiency will not be very different from that in private operations.

The suppression of the profit goal and the influence exerted by the government can be assumed to make the state owned enterprises more amenable to considering social benefit, including externalities that they will not reap, as a guiding criterion for their actions. In mineral exporting developing countries, unemployment is a common problem, and so the shadow wage would be lower than the actual wage. At least during periods of mineral price depression, the current account of such countries would often show a deficit, and so the shadow rate of exchange for their currency would be lower than the official one⁶. An application of these shadow rates will lower the supply curve and raise the demand curve in relation to the ones that would prevail if the market rates were used. This will provide economic justification for higher capacity utilization

⁵H Leibenstein, "X-Efficiency and the Analysis of State Enterprise." Paper presented at the Second BAPEG Conference on Public Enterprises in Mixed Economy LDCs, Boston, April 1980.

⁶Shadow wage rates and rates of exchange are defined as those rates at which full employment and a balanced current account would be attained.

at each level of mineral prices in dollars, and so a lesser degree of output adjustment to varying price levels.

A reciprocal of the costly social concerns of the state mineral firms is an implicit guarantee for financial survival, regularly provided by their owners. State enterprises are rarely allowed to go bankrupt. Undercapitalization resulting from unprofitable operation is regularly remedied through new financial infusions. The implications of such a guarantee should not be overemphasized. Excepting periods of severe mineral price depression, a majority of the large state mineral firms reap significant Ricardian rents which assure financial comfort even after their social obligations have been covered.

What systematic differences can be identified in the investment behavior between state owned firms and private multinational corporations in the mineral industry?

State enterprises, like private ones, would ordinarily develop new production units only when it is commercially justifiable to do so. The capital invested has to yield sufficient return to service the loans, and to provide a return on equity after the costs have been covered. Through their owners, state owned firms may have a somewhat easier access to sources of credit on concessional terms, e.g. from the World Bank or the Regional Development Banks. But such creditors have typically required careful feasibility studies proving commercial viability of the projects to be financed.

In some cases, the governments have used their control to make state enterprises invest in uncommercial ventures, e.g. to promote regional development or to satisfy national strategic needs of the output. Ownership is not a unique means to achieve such public ends. Support of private firms through subsidies or tariffs has accomplished identical objectives in countries where the government has abstained from owning the mineral industry.

There will be a large difference in the rate of return on investments required by state owned and private mineral firms in countries where private foreign investors feel exposed to political risk. The expected return on private mineral projects has to be increased sufficiently to provide an adequate risk premium. State owned enterprises, by definition, are not exposed to the risk of expropriation or milder forms of nationalization. For this reason, in the circumstances just described, their rate of return requirements will be lower.

Turning to the geographical spread of investments, a distinguishing characteristic of state mineral enterprises is their strong preference for investing at home. Exceptions, like the investments of Chilean Codelco and Zambian ZCCM in European downstream processing of copper only underlines the rule. The nationalizations of the 1960s and 1970s frequently involved a rupture of the international vertical integration chains maintained by the private mining companies. The downstream processing facilities located in

the mineral importing countries were out of reach for the nationalization efforts. The lower extent of vertical integration that resulted from the state takeovers, has remained ever since, because of the unwillingness of the state enterprises to invest in processing facilities abroad. The markets for unprocessed and semiprocessed metal minerals have become more competitive as a result of the increasing importance of arms length transactions that has ensued.

Available evidence does not permit a conclusion that state owned mineral enterprises are more or less aggressive than private ones in expanding their market share. Some, like ZCCM in Zambia and Ferrominera in Venezuela have not invested very aggressively and have been losing market shares ever since nationalization. Others, like Brazil's CVRD (in iron ore) have been expanding their relative market positions at very fast rates, but then, so have some private multinationals e.g. RTZ (in copper). Yet other state owned mineral firms, e.g. PT Timah in Indonesia and Codelco in Chile, have experienced extended periods of market contraction after they became state owned, followed by periods of very fast growth that permitted them to resume their former market shares.

The market impact: A summary

The market impact resulting from the above observations can now be summarized.

The inexperience of the state appointed managers who became responsible for running the many mineral companies that were nationalized in the 1960s and 1970s, led to an extended but temporary increase in the cost of production, and a retardation of investments in the state owned universe.

Because of the multiple goals that they are required to pursue, state owned mineral firms will tend to have permanently higher costs of production than equally endowed private companies.

State owned firms have a virtual assurance from their owners about financial survival. Compared to the private mining corporations, their investments have sometimes benefited from an easier access to credit on concessional terms from international agencies.

The tendency to consider social benefit instead of corporate profit will often lower the marginal cost schedule and raise the demand schedule of state mineral firms, and hence reduce their preparedness to adjust output to variations in mineral price.

The rupture of the international vertical integration chains at the time of nationalization, and the unwillingness of the state owned firms to invest abroad has permanently reduced the extent of vertical integration in the mineral industry. This has increased competition in the markets for semi-processed mineral products.

While these conclusions emerge clearly from casual empiricism and are supported by economic logic, it is extremely difficult to provide a formal and definitive empirical vindication to any of them. The major problem is that of detailed and reliable data, but it may also be that the tendencies are not strong enough to be borne out unambiguously in formal tests. For instance, a detailed econometric analysis of the copper industry⁷, failed to confirm a lesser price sensitivity of supply in state owned than in privately owned industries, though it suggested that such sensitivity was lower in poor countries and especially in countries heavily dependent on copper exports.

5. Implications for the private mineral industry

What have been the consequences of the emergence, fast growth and increasing maturity of the state owned enterprise universe, on the competitiveness and viability of the private mineral industry? Several distinctly different impacts can be identified.

Nationalizations

The waves of nationalizations, through which a large proportion of the present state mineral enterprises were established, had, without question a very detrimental impact on the privately owned mineral industry. This impact was felt both at the micro-level of the individual firm, and at the industry-wide level.

Decisions about state takeover were usually preceded by periods of very tense relations between the foreign mineral investor and the host government. Impressed by the impending risk of drastic government intervention, the foreign enterprises often resorted to actions that hurt their own long run interest. When they were implemented, nationalizations often involved the amputation of very low cost sources of corporate raw material supply. Even where compensation was paid, the sums were invariably considered to be grossly inadequate by the former foreign owners. In this way, the preludes to nationalization as well as the nationalization itself, disturbed and disrupted the operations of the affected mineral firms.

At the industry-wide level, the nationalizations implied, *ceteris paribus*, a corresponding relative shrinkage of the market share of the privately owned sector. Over two decades, the Western world state owned capacity grew from insignificance to one third of the total. At least one half of this was probably established through nationalizations. Hence, it is reasonable to claim that the state takeovers of existing operations resulted in a shrinkage of the

⁷A Markowski and M Radetzki, "State Ownership and the Price Sensitivity of Supply: The Case of the Copper Mining Industry", Institute for International Economic Studies, University of Stockholm, Seminar Paper No 351, April 1986.

market share held by private enterprise by almost one percentage point per year as compared to what it would otherwise have been.

With the virtual cessation of nationalizations since about 1980, this detrimental impact is no longer in force.

Ruptured vertical integration

As should be apparent from table 1 above, the setting up of state enterprises has been much more common at the mining stage than at the latter stages of production. Nationalizations often ruptured existing international vertical integration links, and increased the importance of raw materials trade between independent units. Establishment of new state owned mines has further reinforced this tendency. Given the economics of locating mineral processing plants close to the final consumption markets in many cases, and the unwillingness of the state owned firms to invest abroad, the degree of vertical integration in international mineral markets in the 1980s is much less than it was 20 years earlier.

As a result of these developments, many of the multinational firms in the mineral sector have become increasingly dependent on arms length transactions for their raw material needs. This change has made them potentially more vulnerable to the vagaries of the market. The vertical integration links built up by these firms in earlier decades, provided a considerable degree of control over raw material costs and perceived assurance of supply.

Conditions are less predictable, though not necessarily less advantageous now that a large part of the vertical links has disintegrated. The price of raw materials purchased from independent producers varies much more than did the cost of output in wholly owned mines. And the procurement of concentrates and ores necessitates a much more active effort than was needed when in-house supplies satisfied the entire requirement.

One may speculate, however, that the greater degree of competition implied in expanding arms-length trade, has reduced the cost of mineral raw materials. At the same time, it is hard to find evidence that ruptured vertical integration has reduced the reliability of supply. After all, the supply disruptions from far-away mines that have occurred, were usually caused by strikes and political upheavals that would have disturbed the operations of foreign owned subsidiaries in equal measure.

The implications of the setting up cost of state enterprise

The conclusion that nationalization involves a heavy and extended setting up cost, and that managerial inexperience has reduced the average efficiency of the state enterprise universe through the past two decades, leads logically to very important implications for the private mineral industry.

The increase in costs, reduction in capacity utilization and inability to expand capacity that typically follows nationalization, must have given a temporary competitive edge to the private sector in markets where governments had recently taken over a significant share of total capacity. This advantage should have lasted so long as the nationalizations continued on a significant scale, because that assured continued inefficiency in a large part of the state owned sector. Now that nationalizations have virtually ceased, and even the most recently established state owned firms become increasingly mature, the competitive advantage enjoyed by the private industry, must be gradually disappearing.

Developments in the international supply of tin provide a qualitative support for the above argument. As already noted, the Indonesian government's takeover of the country's tin industry involved a very painful and politically inflamed process. The industry remained highly disorganized over a long period of time, and lost substantial market shares. Only in the mid-to-late 1970s had the state owned tin corporation succeeded to develop national managerial and technical talent at an adequate quality level, and to recover the earlier losses in production. Table 2 compares the developments in Indonesia with those of Malaysia, its main competitor, where the industry remained privately owned until the mid-1970s. The rise and subsequent decline of Malaysia's tin production was certainly related to the emergence and gradual resolution of the problems of state ownership in Indonesian tin.

Table 2. Tin production in Indonesia and Malaysia

	1950		1970		1980	
	000 tons	share of WW, %	000 tons	share of WW, %	000 tons	share of WW, %
Indonesia	32.6	19.8	19.1	10.2	32.5	16.1
Malaysia	58.7	35.7	73.8	39.6	61.4	30.5

Source: Metallgesellschaft, Metal Statistics, annual, several issues.

Pursuit of social objectives and public subsidies

Through the 1980s, continuous and very vocal concerns have been expressed by the representatives of North America's mineral industry about the unfair competition this industry was facing from the state owned enterprises in developing countries. The latter, it was held, continued to produce at high rates of capacity utilization, despite the low level of demand, and so contributed to a further depression of the already low metal prices. The resultant losses that they incurred, were compensated by their owner-governments through fresh capital infusions. Private industry in North America did not have access to corresponding public support. In consequence, its viability was being threatened by the aggressive and economically unmotivated production policies of the

state enterprises⁸. No convincing empirical support has been provided in support of these claims, and the purpose of the following paragraphs is to clarify the meaning and substance behind them.

In a historical perspective, metal prices have been quite low in the 1980s, when measured in real terms. The World Bank Index of constant metal and mineral prices indicates a 1981-85 level 19 % below that which prevailed in 1975-79, and 37 % lower than in 1965-74⁹. A number of factors have contributed to the price weakness of recent years, but an important one has been the depressed level of demand.

On many earlier occasions, the metal industries have reacted to depressed prices by coordinated measures to cut supply, and so to force prices to rise to more remunerative levels. Such action has commonly presupposed proportional supply cuts by all producers participating in the scheme. One interpretation of the above views could be that state enterprises and their owners, the governments, are less willing than private multinational firms in the mineral industry, to enter into collusive market arrangements. This view could hardly be sustained at a more general level, given the experiences of the petroleum and bauxite markets of the 1970s, where the governments took a leading role in the efforts to restrict supply and raise prices.

Where there is no supplier collusion, the expected impact of low prices is that producers will cut their capacity utilization whenever their marginal costs exceed price. Application of this rule will imply that producers with high operating costs will implement substantial cuts, while those with more advantageous cost structures continue to operate close to full capacity. Another interpretation of the North American industry's claims is that the state enterprises have not abided by the above rule, and have continued to operate even when their marginal costs exceeded price.

There may be some truth in the contention that state enterprises maintain output at price levels that would induce private firms in identical circumstances to cut production. By implicitly or explicitly considering shadow rates of exchange and shadow wage rates, publicly owned firms in many developing countries will perceive a higher demand curve and a lower supply curve than if the actual market rates had been applied. Hence, they will produce more at each price level. Even if such behavior could be verified, it need not involve a net disadvantage to the private industry, if one compares with an undistorted purely competitive situation. The differences between the market rates of exchange and wages on the

⁸For a summary of these views, see for instance Mining Journal, Dec 9, 1983; or Metallgesellschaft, "Pressmeldungen uber die Metallmärkte, Jan 1984.

⁹World Bank, Commodities Division, 'Primary Commodity Price Forecasts', Aug 18, 1986.

one hand, and the shadow ones, on the other, signify distortions in the national economy, commonly resulting from the government's economic policies. Application of shadow rates, in this sense, implies a rectification of these distortion insofar as the state owned firm is concerned, and a reinstatement of the conditions that would have prevailed in a competitive equilibrium.

Formidable difficulties are encountered in attempts to verify a behavioral difference between state owned and private mineral enterprises concerning rates of capacity utilization. The observation that the North American, almost exclusively privately owned mineral industry, undertook large scale reductions in capacity utilization during the 1980s, while the industries in developing countries where state ownership predominates, did not, is not a proof of behavioral deviation in state owned enterprises, since such a difference could simply be due to differences in operating cost levels. But then, such cost levels are immensely difficult to establish and verify¹⁰. Scattered evidence for various metals suggests that production costs in North America around 1980 were significantly above the world average¹¹. Since then, the relative cost levels in the US and Canada increased substantially, in consequence of the strong appreciation of the US dollar. Between 1980 and 1984, the real appreciation of the dollar, i.e. the combination of differences in rates of inflation and exchange rate changes, amounted to 61 % versus Zambia, 52 % versus South Africa, 23 % versus Australia, 37 % versus Indonesia and the Philippines, 35 % versus Mexico, 55 % versus Chile, 76 % versus Sweden, but no more than 3 % versus Canada¹².

The figures suggest a very strong reduction in the relative competitiveness of the US and Canada as metal producers in relation to the countries enumerated. This, along with the relatively weak competitive position in the beginning of the period, may be sufficient to explain why virtually all capacity reductions in response to the weak prices, took place in North America. The US and Canadian metal producers became increasingly marginal suppliers in consequence of the rising dollar. Their output cuts - as well as the maintenance of production elsewhere - can be explained by standard microeconomic theory. State ownership becomes irrelevant in this light. Output of copper from Chile would not have been cut, even if the great mines in that country had remained in private US

¹⁰Markowski and Radetzki, op. cit.

¹¹This is apparent, for instance, from several reports issued in the early 1980s by the Commodities Research Unit. For evidence from a specific industry, see A F Barsotti and R D Rosencranz, 'Estimated Costs for the Recovery of Copper from Demonstrated Resources in Market Economy Countries', Natural Resources Forum, No 2, 1983.

¹²World Bank, 'Changing Structure of the World Copper Industry and its Future Prospects', draft, April 1986.

ownership, simply because the cost of producing that output was lower than the cost of production in most US installations.

There is definitely some truth in the statement that mineral firms under public ownership enjoy a degree of assurance from their owners against financial distress. Also, such firms have at times received subsidized financial support from their governments. In some cases, the governments have simply forwarded to their companies loans on advantageous terms, obtained from international agencies like the World Bank Group. Where financial assurances and financial subsidies were provided, they obviously strengthened the competitive position of the state owned firms vis-a-vis the private industry. But to get a complete picture, these advantages must be juxtaposed against the costs for pursuing various social goals imposed on such firms. It is reasonable to regard the financial benefits as a compensation for the cost of the social obligations that the state enterprises were asked to fulfill. When these obligations are taken into account, it is by no means certain that the state enterprises reaped a net gain in competitive strength from the financial support they received from their owners. It should be added that, perhaps with the exception of the oil exporting countries during the OPEC decade, the mineral exporting developing countries' governments have not had the resources to support their state owned mineral firms financially on a sustained basis. On the contrary, in a somewhat longer run, these firms have been invariably required to make positive contributions to their owners.

Does state ownership impose a survival threat to the private mineral industry?

The arguments of this section can now be summarized.

The widespread nationalizations through which a large part of the state owned mineral enterprise universe was established during the 1960s and 1970s, constituted a very serious threat to the private mineral industry. Its proportion of total mineral production capacity was heavily curtailed, it suffered from inadequate compensation for the assets taken over, and many individual multinational firms were severely mutilated in the process. This threat is no longer in force, since the nationalization process appears to have come to an end.

The nationalizations brought about an important and apparently permanent change to the market structure in many mineral markets, by rupturing existing international vertical integration chains. As a result, the private multinational mineral firms have to rely to a much greater extent than before on arms length trade for their raw materials supply.

The establishment of state enterprises through nationalizations regularly involved a heavy and extended setting up cost. Over the past two decades, the average efficiency of the state owned enterprise universe has been depressed by the inexperience of the

newly set up firms. This provided for a distinct competitive advantage to the private industry. Nationalizations have by and large ceased since the early 1980s, and so the inefficiencies due to inexperience are gradually overcome, as the state owned enterprise universe is becoming increasingly mature. The competitive advantage enjoyed by the privately owned sector on this count is consequently being eroded.

It is possible, but very hard to prove, that the output of state owned enterprises is less responsive to price than that of private firms. To the extent that this is due to the use of shadow exchange and wage rates rather than the rates that prevail in the market, the behavior of the state enterprises can be seen to rectify policy induced distortions in the countries where they operate. A more likely explanation to the lesser responsiveness to price change is that many state firms have lower costs than their private competitors.

State owned firms do on occasion receive financial subsidies from their owners, but the competitive impact of such subsidies should be weighed against the costly pursuit of various social goals imposed on them by their owners.

The findings emerging from the above analyses do not support the claim that the state owned mineral enterprise universe constitutes a survival threat to the private mineral industry. The claim has come, in the main, from North American industry representatives, and has been voiced, especially loudly, during the 1980s. The North American mineral industry is indeed going through a very difficult time during the present decade. Contributing to its difficulties is the relative depletion of its mineral wealth, the depressed metal demand, the very low metal prices, but above all the severe deterioration in the industry's international competitiveness, caused by the exchange rate changes that have occurred since 1980. These factors, and not the behavior of the state owned mineral enterprise universe, constitute the major survival threat to the North American mining and mineral processing industry.

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