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INTERNATIONAL MARKETS FOR EXHAUSTIBLE RESOURCES,
LESS DEVELOPED COUNTRIES, AND TRANSNATIONAL CORPORATIONS

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International Markets for Exhaustible Resources,
Less Developed Countries, and Transnational Corporations

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Both economic theory and history teach that the topic of international markets for exhaustible resources is a difficult and troubled one. This essay will survey the relevant literature, elaborating on the difficulties and the troubles. Positive analysis will lead us to predict more of the same in the future. But perhaps a better understanding of the issues could lead to modest normative suggestions regarding ways of improving the workings of such markets.

Trade in exhaustible minerals, even when carried out by nationals of the same country, is different than trade in corn or screws. The first inevitably involves inter-temporal calculations, while the latter do not. When such trade is carried out internationally, further complications arise. The world is such that mineral deposits are typically not evenly spread among countries, nor of even quality, thus generating Ricardian rents. Uncertainty often surrounds the future of technical change in products using minerals as inputs, as well as the technology used in mines. Discovery of new mines has often been dramatic and discontinuous. Property titles to the new mines can be blurry. The exploitation of mines or deposits, as well as the distribution and processing of their output, usually requires large masses of capital relative to other inputs and a tight organization. The development of new mines or deposits usually

take a good deal of planning time. Exhaustible resources seem like special gifts from the gods, in the sense that they appear to be at a given time unique substances very difficult to substitute in consumption or production. And yet their uniqueness can be wiped out overnight by technical change.

Where markets are so plagued with both uncertainty and the need for large capital commitments, it is not surprising to find large organizations which try to control and regulate trade and investment in exhaustible resources. And as many governments have perceived that such resources are vital to "national security," it follows that those large organizations, even when theoretically private, have had especial links with home and host countries.

Little wonder, then, that throughout history trade in minerals has been associated with a violence and conflict surprising even to a melancholy mid-ocean auctioneer. The regions now under the sovereignty of less developed countries (LDCs) have held and still hold a good share of the world's store of economically valuable exhaustible resources; it could be argued that remaining deposits and ore bodies in LDCs are of higher grade than those in industrialized countries, as the latter have been worked and prospected more intensively. But from the days of the Spanish search for American gold, at least, through those of Belgian mines in the Congo, the people inhabiting those regions have had reason to wonder about the net benefits to them of such endowments, and of international trade in their outputs.

The first half of the paper will survey analytical points arising from several branches of economics, such as capital theory, international trade and industrial organization. It will also deal, somewhat amateurishly, with bits of history and politics. The second half will review policy proposals ranging

from grand designs for a new world order for trade and investment in exhaustible resources, to more modest suggestions in areas such as taxation and contracts. At the end of the paper the reader will be reminded of some of the areas neglected in this survey essay.

The Pure Economics of Exhaustible Resources

A positive side-effect of OPEC's success has been a rebirth of interest in the pure economics of natural resources. Some of the best brains in the profession have flocked to analyse issues largely dormant since the days of Hotelling's classic article.¹ While the area has become a playground of high-powered theorists, the basic economic results of their work provide insights into the less formal issues of interest to us.

A fixed and known stock of an exhaustible resource in the ground may be regarded as a capital asset, among other assets which a given owner, or a country may have. The representative owner will have to decide whether to exploit the resource, or to leave it underground. If the marginal costs of exploitation and the present and future prices of the resource are known to the owner, assumed to be a price taker, the decision for him will be straightforward. Stock equilibrium for resource owners will be realized when they expect the price of the resource, net of costs, to increase at a rate equal to that of the ruling interest rate. Only under these conditions will the resources in the ground, assumed to be homogeneous, yield a rate of return to their owners equal to those of other assets. Efficiency calls for all forms of investment having the same yields; in other words, Venezuela should "sow petroleum" into new factories and schools only while the rate of return of those produced assets is higher than the appreciation of oil in her ground.

If the equilibrium condition does not hold, owners will be dissatisfied with the structure of their portfolios, and will wish to have more or less assets in the ground.

Under these assumptions, the equilibrium time profile for the net price will have an upward tilt. Consumers of the resource will pay the net price plus extraction unit costs. When current consumption is small relative to total stocks of the resource, the net price (pure rent) component in the final price will be small. In that case, the economics of that good approaches that of renewable resources. Salt, limestone, and other minerals used in cement production may be given as examples. But for many exhaustible resources it can be expected that eventually the scarcity rent will begin to dominate the movement in the market price. The transition, in fact, may be abrupt, and expectations regarding future prices may be revised discontinuously.

Notice that full equilibrium requires not only the portfolio conditions discussed above, but also a balance in the flows demanded and supplied for each time period, at the equilibrium price. The flow market which has to clear is not just one market, but the sequence of markets for the resource from now until the date of exhaustion.

Those who glibly take for granted the efficiency of existing world markets for exhaustible resources may wish to consider Robert Solow's evaluation of how likely the efficient equilibrium described above is likely to be observed in practice:

"But there clearly is not a full set of futures markets; natural-resource markets work with a combination of myopic flow transactions and rather more farsighted asset trans-

actions. It is legitimate to ask whether observed resource prices are to be interpreted as approximations to equilibrium prices, or whether the equilibrium is so unstable that momentary prices are not only a bad indicator of equilibrium relationships, but also a bad guide to resource allocation. That turns out not to be an easy question to answer. Flow considerations and stock considerations work in opposite directions. The flow markets by themselves could easily be unstable; but the asset markets provide a corrective force."²

A whole set of additional difficulties hides behind previous references to interest rates, rates of return, and such, which were presumed to be equal, and given, and "right." In short, no difference was postulated between private and social rates of discount. Yet what may be a sensible discount rate for Anaconda or Exxon need not be the correct rate which should be used, say, by Chilean or United States government officials planning social policy. The former should take into account such things as taxes on capital returns, expropriation risks, etc., while the latter should not usually consider them. Some would go further, denying that private time preferences should form the bases for intertemporal decisions, and that the utilities of future generations should be given the same weight as those of present generations. At any rate, the choice of a rate of social time preference is crucial, involving a decision about intergenerational distribution. To quote Robert M. Solow again:

"The pure theory of exhaustible resources is trying to tell us that, if exhaustible resources really matter, then

the balance between present and future is more delicate than we are accustomed to think; and then the choice of a discount rate can be pretty important and one ought not to be too casual about it."³

The Hotelling microeconomic model clearly makes a large number of simplifying assumptions, which explains why historical experience does not easily fit with its predictions (e.g., relative copper prices are lower today than 100 years ago).⁴ Resources labeled exhaustible may better be referred to as nonrenewable. Nevertheless, the simplest natural resource models already highlight that even if we limit the analysis to competitive markets within one country, to homogeneous deposits and little uncertainty, doubts arise regarding the stability and efficiency in those markets. Yet more complexities lie ahead.

The International Dimension

Within a country, some regions will have an excess supply of minerals and fuels (e.g., Montana and Texas), while others will have an excess demand for them (e.g., New England). Both types of regions will, however, live under laws, customs and habits which are not too dissimilar, so that depletion allowances, taxes, discount rates, and subsoil property rights are roughly common. Rules for the settlement of disputes, anti-trust laws, etc., will be comparable. Within the United States, contracts made in one state must be honored in others, while trade restrictions between states are prohibited. Under these circumstances, markets have a reasonable chance to perform their functions, even if subject to the difficulties discussed earlier. In spite of this, the clash of divergent

regional economic interests regarding natural resources will find and echo, and often more than that, in the political arena of Congress or Parliament, and the Texas Railroad Commission will consider necessary the sending of "a message to Washington" by ordering oil production cutbacks.⁵

Compared with most national markets, which are buttressed by laws and established customs, international markets are a jungle. For auction⁶ or spot markets this may be relatively unimportant, but for markets involving long horizons the trouble is more serious. And it was seen in the previous section that the theory of exhaustible resources underlines the importance of the long view.

Suppose one has countries with high discount rates and countries with low discount rates. Now assume that some countries are net users of exhaustible resources and others are net producers. If the number of both types of countries were large, and the resources were more or less evenly spread among all countries, perhaps international markets could be organized so that every net consuming country can get what it wants from a willing net producer country, without any discussion of freedom of access to supplies nor political pressures.

But now suppose there is only a handful of net producers, and that they happen to be firm believers in conservation, having a very low discount rate, perhaps for religious reasons. Net consumers of that exhaustible resource will be tempted to politicize this international market, and will philosophise regarding the right of a handful of countries to control world supplies. (The net producers, in turn, will philosophise on the right of a handful of countries to account for high shares of world consumption.) The point was put forcefully, and in a rather extreme form, by R. G. Hawtrey

as far back as 1930:

"Mankind has become dependent on the systematic use of the material resources of the world, and cannot afford to allow those resources to be withheld from use through the shortcomings of communities which rule over them. This applies not only to primitive communities, but to any sovereign authorities which obstruct development."

....

"The positive guiding principle should be not justice but expediency, and expediency here means aiming at the maximum of material welfare, without restriction to any particular section, group or nation."⁷

The legitimacy of ownership of natural resources has other troubling dimensions. Within countries, laws may regard the subsoil as common property of the whole nation, not subject to private ownership. This can lead to the establishment of national monopolies for the exploitation of natural resources, whose presence in international trade and investment creates fresh difficulties for those hoping to establish clear rules of the game for international markets. It can also lead to the granting of very long term leases, whose original terms are made obsolete by changing circumstances. One may also note that in the United States, federal law restricts foreign participation in U.S. enterprises associated with the development of federally-owned mineral resources.

A good share of the earth, such as the oceans and the Poles, has no clear property titles, and its nonrenewable resources are open for

exploitation to all capable of doing so. This free access generates technological external diseconomies and gross economic inefficiencies. It also sets the stage for dangerous political frictions among overlapping claimants.

Further Annoying Complications of the Real World

Of all factors of production, exhaustible natural resources are among the least evenly spread among nations, the least homogeneous and the least mobile. Trade theorists familiar with Labor and Capital find this messy third input tricky to handle but difficult to ignore, particularly after Leontieff's paradox. All natural resources may be lumped together into an ill-defined Ricardian "atmosphere," influencing labor productivity while shattering the assumption of identical production functions. Linear homogeneity in Labor and Capital, of course, has to be revised. Location theorists may be called for help. And so on.

But trade theorists like those headaches. Perhaps more relevant to our preoccupations are the enormous costs involved in obtaining information about new deposits of resources, matched by the huge rewards awaiting those who find them. Throughout history, the hope of a fabulous bonanza has been a powerfully motivating force going far beyond narrow economic behavior. The hope for a bonanza, together with the hope for a major invention, trigger efforts qualitatively different from those of the representative entrepreneur who shaves costs in the struggle for a normal rate of return.

The search for both new deposits and inventions has become increasingly systematized; large organizations with massive exploration or research budgets have on the whole replaced the maverick inventor or

prospector. Yet it remains difficult to pin down the chances of substantive technological breakthroughs or the discovery of important new mineral sources to a clearly defined probability distribution. Historically, at least, the search for new deposits does not appear to have been a matter of obtaining a bit more information by spending a little more. The information break between before and after discovery has often been sharp, a matter which, as will be seen below, also sets up cycles of bargaining strength between searchers and owners of resources.

Discovery of large new deposits may not much influence total world output of that commodity, particularly in the short run, but it is likely to have a dramatic impact on its price, if open market exist for it, or on the plans of the organizations involved in the trade of that resource, if such organizations have replaced open markets. Output of existing mines will dominate observed quantities, while breakthroughs in information will be registered more in open market prices and/or investment plans.

The fact that often a handful of deposits are far superior to others (the Potosí silver mines, the Saudi Arabian oil pool, the South African gold mines, etc.) is to some observers a more important characteristic in explaining the economic history of mineral trade than the exhaustible nature of those commodities. Advantage of one deposit over others can arise from location rather than mineral quality. The Ricardian model of differential rents, originally applied to an ever renewable resource (land), would be more relevant than a Hotelling model with exhaustible homogeneous deposits. Differential rents for minerals, of course, could be expected to be larger than for land, but otherwise (so the argument goes) little would be lost by dropping the exhaustible characteristic of the resources.

As noted earlier, when current consumption is small relative to total stocks of an exhaustible resource, its final price will only have a small component of what may be called Hotelling rent. It could, nevertheless, for deposits of high quality or choice location, include a high share of Ricardian rent. The average mix of rents will be different for different exhaustible natural resources; the analyst should take both of them into account.

Besides the uncertainty about reserves, the related uncertainty regarding future technologies will hamper the smooth operation of markets. The uncertainty can be, first of all, about techniques for searching for new deposits. New technologies can also appear for working known mines, influencing unit costs. Industries using resources as inputs can change their unit input requirements thanks to technical change, or changes in tastes or the introduction of new final goods (e.g., the automobile) may drastically change the structure of the derived demand for resource inputs. Technical change can generate cheap substitutes for resource inputs previously regarded as critical; witness the history of Chilean nitrates and Peruvian guano.

Economic life, of course, is full of all types of uncertainty. The argument is that in the field of exhaustible natural resources such uncertainty seems to be especially great. Economic activities also require capital and certain minimum scale of operations to make sense. Both the search for new deposits and their exploitation appear to be, once again, especially capital intensive, where capital includes both physical and human capital, as well as social overhead capital. (Many mines are located in remote places.) Such capital intensity plus organization

requirements in production, transportation and marketing combine to generate indivisibilities in the production and distribution of many exhaustible natural resources. As a result, for substantial output ranges marginal costs are considerably below average costs, even if the former are rising. Viewed in a more Austrian fashion, new mining projects also have long gestation periods, and many things can happen between the time it is decided to go ahead with the development of a new mine, and the time output actually begins to flow out of it.

Some observers claim that both the capital and time intensity of new projects, as well as their lumpiness, have become even more marked in recent years. This could be due partly to a more intensive working of the Ricardian margin, which also raises intra-marginal rents, but also to the realization that a resource previously regarded as free, i.e., clean environment, is after all yet another exhaustible natural resource. Although exhaustible and not subject to rising private marginal costs, clean environment has shared with ocean resources the feature of non-appropriability; in the absence of clear social rules there has been a tendency to use it inefficiently and excessively. But the new social rules to avoid using up clean environment too fast in the process of, say, mining copper, involve larger expenditures of capital. These rules could vary from country to country, either because of different social tastes for clean environment, or because of different endowments of clean environment in the various countries. It is perhaps unnecessary to elaborate on how different national rules on environment protection, as well as on how imperfections in capital markets, could increase the difficulties for open and competitive international markets for exhaustible resources which require ever-increasing and lumpy doses of

capital for their socially acceptable exploitation.

Before turning to the examination of how real world nations and institutions have handled these textbook nightmares, a further complication, which perhaps should have been placed first in the list, may be added. Whether rightly or wrongly, many societies have regarded some exhaustible natural resources as "critical," "essential" or "vital" to their welfare. Advanced industrial economies, for example, have so regarded oil. Nations whose economies are heavily dependent on the production of one or two of those resources have, for different reasons, similar fixations. It is a fair guess that markets are unlikely to operate in textbookish fashion for commodities regarded as "lifeblood" and such.

Enter Trans-National Corporations (TNCs)

A Martian reader of Arrow and Solow could expect that the complexities discussed so far would be handled by an intricate network of futures, insurance, and contingency markets, and would rush to The Wall Street Journal to delight in how November 1982 copper quotations would mesh with insurance rates against the contingency of earthquakes in Chilean mines. But he would be lucky to find a handful of futures quotations, and for fairly close dates at that, for exhaustible resources (he would find more futures' quotations for other raw materials). He may get some lints from stock market quotations for shares of companies owning mineral deposits. But the number of these are few, and declining.

Why the lack of futures prices? The immediate answer is that a dominant share of international (and national) commerce in exhaustible natural resources is carried out within large vertically integrated firms,

which substitute corporate planning for open competitive markets, either of the auction type or those involving long-term but arm's length contracts. Part of the explanation for such a substitution has to do with the relatively poor performance of open markets in the presence of the uncertainties and complexities discussed earlier. For commodities with high fixed and low variable costs, and where information is imperfect, badly diffused or asymmetrically located, it is reasonable to expect a nonmarket institution to replace the market. And incentives for vertical integration become large when uncertainty regarding the supply price of the upstream good pressures the informational needs of downstream firms.⁸ Conditions in the trade of oil, bauxite, nickel, and copper appear to meet amply these requirements for the emergence of nonmarket institutions. Notice that once these institutions have become going concerns they in turn undermine the possibility of open markets. Even if circumstances change, and auction markets or long term contracts at arm's length become feasible alternatives, the previous existence of TNCs will hamper their emergence. Once they have come into existence, TNCs will routinely erect and protect barriers to entry, including hoarding mineral deposits, limiting technological diffusion and establishing exclusive marketing networks.

The above does not rule out the existence of oligopolistic rivalry among TNCs engaged in international trade and investment, nor entry of new actors into the oligopolistic game. Patterns of rivalry and cooperation have changed over the years and have varied among resources; in copper and oil, for example, the pre-world-war-two degree of world market control by a handful of firms has been eroded during the postwar, while the diamond cartel appears as strong as ever and the nickel oligopoly remains robust.

The standard scenario includes a few established firms (the "majors") controlling most known deposits and with a strong interest in preserving oligopolistic stability, for which purpose they raise barriers to entry. Lean and hungry potential entrants (the "independents") are their natural enemies. If the latter obtain access to rich new deposits, as Occidental did with Libian oil during the 1960s, the majors can get into trouble.

New entrants into the exploitation of a given nonrenewable natural resource are often firms long established in another. The creation of totally new firms appears most likely in new types of activities, as with mining the seabed. The propensity of established natural resource firms to diversify and form consortia seems to be on the rise, partly to diversify risks and maintain oligopolistic order, and partly to deter host countries from obtaining competitive bids from independent firms or to raise the costs to those countries of potential disagreements with foreign firms. Anti-trust legislation in some industrialized countries checks somewhat this tendency toward collusion, but mainly insofar as it damages their own consumers. Collusion of national firms when dealing with foreigners, in fact, is often encouraged by that legislation.

Is this all there is to it? Why, in particular, have until recently most TNCs engaged in the commerce of exhaustible natural resources come from a handful of countries? It could be argued that nationals of those countries, which historically have been dominant both economically and politically, have a comparative advantage in dealing with the uncertainty and informational requirements of the commerce in exhaustible resources, or indeed in all international activities characterized by such requirements. This may be so, but only if such "comparative advantage" is

broadly defined to include contacts with their home governments, and the symbiotic relationship which historically has characterized the dealings of TNCs with the governments of the United Kingdom and the United States, in particular.

The argument is neither that home governments are simply the tools of TNCs, nor that TNCs are the submissive instruments of hegemonic powers, but to stress that in an area plagued with uncertainty, and where information is highly prized, the pressures toward considerable interaction between TNCs and home governments have historically been very great. This mutually supportive relationship has been clearest perhaps in the case of oil, especially in the years around the First World War, and the decade and a half following the outbreak of the Second World War. "Quite simply, parent governments have generally been willing to leave the industry's running to more-or-less private companies, but, being aware of the strategic importance of oil from the 1910s at least, have been willing to step in to support them whenever necessary . . . Occasionally when a major ran afoul of a producing government, the parental authorities have provided diplomatic support, though this has generally been in an overt form, and has not always been marked by total enthusiasm (particularly in later years)."⁹

It could be argued that the politician's concern with stable, secure and cheap access for his country to exhaustible natural resources has been tinged with irrationality throughout history, from the Pharaohs to Tojo. Markets, after all, could have done the job, and without being dominated or replaced by TNCs. We shall explore this possibility toward the end of this paper. But it is well to remember that not so long ago raw materials were regarded as the bases of military power, the causes of war, and occasion

for economic struggle. The Atlantic Charter gave prominent place to access to raw materials; earlier Herbert Hoover had given great weight to his fight as Secretary of Commerce against what he regarded as European cartelization of some raw materials. More recently, a sophisticated observer has flatly stated: "From an American perspective, military intervention might be most readily occasioned by our fears of resource scarcity."¹⁰

The case of Japan, after its defeat in World War II, is of particular interest when considering what is sometimes referred as the three basic types of security: military, food and energy. Japanese officials continue to worry that the growth of their country will be increasingly constrained by lack of available supplies of natural resource imports, and about the vulnerability of an economy so dependent on imported energy and natural resources. Such considerations heavily influence Japanese foreign policy: in the delicate balancing of links with China, which may become an important oil exporter, and the U.S.S.R., whose Siberia offers an even more attractive source of potential supplies; in foreign aid programs, frankly designed to please exporters of raw materials and their friends; and in the allocation of direct foreign investment, which increasingly goes into processing industries in resource rich countries.¹¹ Although now lacking in substantial military power of its own, it is not surprising that Japanese officials prefer to handle their resource diplomacy to a large extent via Japanese firms, rather than foreign-owned TNCs. Japanese firms have accommodated themselves more readily to new modalities for obtaining natural resources, such as joint ventures with host country organizations and long term contracts, than have the classic TNCs from the nations victorious during World War II.

The Japanese are remarkably candid regarding their resource

diplomacy, and the linkages between their aid, trade and direct foreign investment policies, on one hand, and their anxiety to secure access to LDC fuels and mineral resources, on the other. But much the same thing is likely to go on in France, Germany and other industrialized countries.

It would be difficult to argue that the manner in which international trade and production of exhaustible natural resources has been carried out over, say, the last one hundred years, was solely dependent on purely technological and economic data, independently of the political realities within and among countries. As those political realities change, even if no changes occur in other data, the actors involved in the production and trade of resources will also be modified, and their pattern of interaction will be different from the past. National rivalries present a barrier to TNCs in their efforts to control and internalize markets; for example, the Italian state oil corporation pioneered in the destruction of the hegemony of the "seven sisters." Under other circumstances, governmental actions can encourage the dominance of a handful of firms, as noted for pre-world-war-two oil, and as may be happening with U.S. firms for undersea mining. And political decisions are thrusting forward names such as BRASPETRO (the Brazilian oil state company) and CODELCO (the Chilean copper state company) onto the financial pages of the world.

Enter the LDCs

How does one explain the secular upward trend in Venezuela's share of oil revenues obtained from her soil, or the rise in the Chilean or Zambian shares in copper revenues? Has such a rise been at the expense of excess profits of TNCs exploiting the resource, or at the expense of consumers of

the resource, or simply the workings of the invisible hand?

A first hypothesis could be that as both Hotelling and Ricardian rents have increased through time, they have naturally accrued to the owners of the scarce resources, i.e., the LDCs. LDC shares sixty years ago were low, so the argument would run, simply because pure rents at that time were negligible, competitive prices being made up almost wholly by real costs, including a normal rate of return to capital. This story does not ring true; bits of evidence indicate that profits in many mining ventures and in oil were above the normal level, although it is far from clear whether the super-profits came from the appropriation by TNCs of Hotelling or Ricardian rents, or from their oligopolistic prices, or perhaps from unusual efficiency. Kennecott, for example, has been reported to have been making 20%-40% per year on its investment in El Teniente, in Chile, during the late 1920s.¹²

"Increase in bargaining power" is the magic phrase which appears to answer best the first question raised in this section. But exactly what factors account for the rise in such power is a more debatable issue. To bargain effectively, the LDCs needed first of all sovereignty, a matter not obtained until after the second world war in many parts of the third world. Secondly, their policy makers needed a minimum of freedom from physical coercion, represented by foreign gunboats and such. Diffusion of world military power, and competition among the handful of super-powers, provided the necessary (even if limited) room for manouver. Thirdly, and related to the previous point, the expansion during the last 30 years in the number of foreign firms of different nationalities which are buyers of raw materials and suppliers of capital and technology increased LDC options. Fourthly, LDC policy makers required the will to get a bigger share, and not just for

themselves personally. Domestic political pressures in this direction increased as third world populations gained in political awareness. And last but not least, the creation of local expertise and knowledge regarding the relevant industry, its customers and competitors, made credible the threat of having the host country run the mines and deposits by themselves. This process still has far to go; it is striking how few Chileans know the intricacies of world marketing in copper, how few Venezuelans are familiar with the Middle East oil industry, etc.

But the third world, and countries such as Australia and Canada, have come a long way since the days when Lázaro Cárdenas nationalized Mexican oil in 1937, while the not too unsympathetic Franklin D. Roosevelt was President of the United States. In retrospect, the amount of potential LDC revenues lost by lack of bargaining power are likely to be very large. I have elsewhere suggested the following mental experiment: what would have been the LDC share in the rents produced by their natural resources (say in 1900, or 1920, or 1950) had those countries granted permission to exploit those natural resources only on the basis of competitive bidding, open to buyers from all over the world? The difference between the revenues obtained and those which could have been obtained is likely to be substantial, and may be blamed basically on the use of political and oligopsonistic power by the major users of natural resources.

Yet, also in retrospect, it could be argued that the characteristics of mineral industries made the rise of LDC bargaining power almost inevitable. The concentration of mines or deposits, in contrast with the diffusion in the production of most tropical crops, made taxable surplus highly visible even to a "soft state," and, eventually, also quite vulnerable to the exchequer.

Fed by revenues from mines, LDC governments could expand and improve their expertise. There has always been the danger that a sudden expansion of national revenues could lead to a rentier mentality with disastrous long term developmental consequences; this is the fear of thoughtful Venezuelans who compare the situation in their country today with that of sixteenth-century Spain. But in spite of extravagance, under contemporary circumstances, a good share of tax revenues will find its way to developmental expenditures which will further reinforce the nation's ability to bargain, while creating habits and expectations which place a floor on national claims on mineral activities. Those habits and expectations do limit the willingness of the host country to display bargaining power by shutting down mining operations, yet visible, concentrated and vulnerable installations provide a continuous temptation to do so if the LDC feels sufficiently aggrieved.

Net resources subject to negotiation between TNCs and LDCs may be of two kinds: the Hotelling or Ricardian pure rents which would arise even under conditions of perfect competition, and the excess profits generated by departures from perfect competition in the sale of the resources. Until recently, one took for granted that LDCs were gradually increasing their share of pure rents, a process which need not affect prices paid by consumers. Since 1973 there have been a growing number of analysts suggesting that LDCs will bargain also for an increasing share of what may be called oligopolistic excess profits, and that they will also try to increase the level of such profits, naturally at the expense of consumers. In the struggle over pure rents, LDCs would match wits with TNCs, while consumers remain more or less indifferent spectators. The lure of oligopolistic excess profits would mute the LDC-TNC clash, as both would be

allied against the consumer.¹³

It should be noted that oligopolistic excess profits need not be reflected in above average book rates of return for TNCs, even in the absence of LDC pressures. Often such surplus is dissipated in buying security of supplies or sales, or in buying political power, tranquility and comfort for the bureaucracies running the organization. Funds may be spent casting dollar ballots for favorite politicians, or in lavish advertisements showing how the company loves fish and fowl in the environment, or simply padding payrolls. The power and prestige attached to controlling such "costs" will lure LDC bargainers as much as declared excess profits.

The game has indeed become complicated. But one somewhat paradoxical trend should be stressed: even as some observers in industrialized countries warn of LDC "cartelization" of resource markets, basing themselves mainly on the OPEC experience,¹⁴ LDC actions have unleashed in several of those markets pressures pushing toward greater competition. The point is simply that the number of independent actors in those markets has increased with the proliferation of national companies in charge of at least the production of minerals. The national companies are not (as yet) as vertically integrated as the TNCs they replace. This means, inter alia, that users of natural resources see expanded their range of choice, while past special relationships between upstream and downstream firms become shaken. This may be a temporary phase in world markets, but while it lasts it creates an opportunity for open competitive world markets in minerals which did not exist while those markets were internalized by TNCs. It is peculiar that many worrying about LDC "cartelization" of bauxite showed little concern about how the bauxite and aluminum markets worked before LDC actions, and

say little about the long run effects of, say, Jamaican actions over the degree of competition in aluminum products.

A New Order in International Markets for
Exhaustible Natural Resources?

Since 1973 a number of fresh and not-so-fresh proposals have been advanced for restructuring world trade and investment in exhaustible natural resources, ranging from those designed to stabilize the prices for those products, to more ambitious ones, such as the International Resources Bank idea, presented by the U.S. Secretary of State to a surprised UNCTAD conference at Nairobi in May 1976. But before examining possible scenarios for the new order, it will be desirable to examine some features of the old which have been only hinted at in earlier pages.

A central feature of the old order was that for fuel and several minerals TNCs, for all their oligopolistic rivalries, ran effective commodity stabilization schemes, at least for substantial segments of the market. During most of the post-second-world-war period, particularly during 1953-1971, world dollar prices for oil, iron ore, bauxite, nickel, molybdenum and magnesium were relatively stable in nominal terms. This was done by a combination of buffer stocks strategically held at several places within vertically integrated TNCs, control over supplies with elastic production responses, plus information and marketing networks which could be used to allocate or ration available supplies among different types of customers, ranged from most preferred (often other departments of the TNC itself) to least preferred. In some products, such as copper, part of the market was under this kind of regime, while the remainder could be regarded as closer to an "aution market," centering around the London Metal Exchange,

and operating under arms-length rules. Even as some copper users enjoyed especial "customer relations" with producers, guaranteeing stable prices and a favored place in the queue for supplies, others faced considerable price instability for their raw materials, probably aggravated by the segmented nature of world copper markets.

Under the commodity stabilization regimes of the TNCs, investment planning, including the search for new deposits and new technologies, relied more on a long view generated by their intelligence networks than on the fluctuations of spot or future markets for minerals, as registered in open markets. This, of course, made a great deal of sense as, for example, the fluctuations of copper prices in the London Metal Exchange (or of those for zinc, lead, or tin) are likely to be inefficient predictors of the situation in those markets five years hence. The central intelligence of TNCs, in short, can improve on segmented and marginal markets. Compared with nineteenth century bonanza stories, they can also rationalize the world-wide search for new deposits; indeed, this has to be an integral part of their attempt to keep world markets orderly.

The TNC commodity stabilization regimes showed their clearest features during war-time, when TNC-parent government cooperation naturally became quite open, as parent governments would insist in their role as the preferred customer. Thus, during the Korean War, the TNC rationing machinery, supervised by the U.S. government, was used to dampen price increases in copper, to the unhappiness of copper-producing countries.

The rise in the bargaining power of the LDCs where mineral and fuel deposits are located are threatening the commodity stabilization regimes of the TNCs, and the hierarchies implicit in them for customers and

governments. Already during the Vietnam War, for example, Chile extracted concessional loans from the United States as a condition for going along with arrangements which during the Korean War were simply imposed by the United States. As noted earlier, the greater number of key actors in world markets for exhaustible resources seems to promise greater competition and more choices for actual and potential consumers, including as potential actors and consumers the socialist countries of Eastern Europe, Asia and the Caribbean. But there is little to assure us that this new competition will lead to reasonably efficient and stable world markets, nor to politically acceptable ones. It is not so much that many of the new actors are state enterprises, whose actions are likely to be at least as politically motivated as those of the classic TNCs. Neither is it that LDC pressures lead TNCs to dampen their oligopolistic rivalries, promoting corporate consortia and financial interpenetration within and across types of exhaustible natural resources, although some of this seems to be occurring. National rivalries among industrialized countries, at any rate, are likely to put a ceiling on such a process of concentration. The basic problem is that clear rules for these world markets do not exist, on matters such as access to supplies, access to national markets, settlement of disputes, etc. Where some sort of authority is not present to impose "accountability conditions to guard against conscious fraud or unintentional overcommitment by individual economic agents" at a reasonable cost, one should expect that "trade in any but short-term and easily monitored and enforced contracts to be severely limited."¹⁵

Immediately after the Second World War, the Havana Charter for the International Trade Organization (ITO) provided a useful first approach

toward such a framework, including both rules for state enterprises and what may be called Keynes-ITO commodity stabilization agreements. By the early 1950s hopes for United States ratification of the Havana Charter were dead, while world trade in exhaustible natural resources was once again dominated by central intelligence units, in the form of TNCs from a handful of countries. Institutions arising from war and postwar planning, in fact, tended to support and consolidate such a regime; recall how the International Bank for Reconstruction and Development would refuse lending to state-owned LDC enterprises in oil on the grounds that private capital was available for those activities, naturally from TNCs.

So one possibility for the near future is that with the TNC commodity stabilization regime in decadence, and no alternative regime in place, world markets for exhaustible resources would become more competitive in some sense, but also more unstable and unpredictable. Under these circumstances, prices observed in markets will be poor guides for fresh investments. Eventually the world market will once again become fragmented, as users of raw materials seeking predictability in prices and in the flow of supplies will seek special "consumer relationships" with producers. This could occur in geographical patterns of the "spheres of influence" type.

An alternative scenario would feature the emergence of a modus vivendi between LDC national enterprises, which could include paper organizations, and the TNCs. This collusion between LDCs and TNCs to share in oligopoly profits is what some observers see as a key feature of OPEC, and what some see as desirable in the copper case.¹⁶ The stability of this new partnership will depend on other changes in world markets, particularly those where management, technology and capital can be hired

separately, as well as the will of LDCs to expand their capacity to combine all of these inputs. But it would give a new lease on life to TNCs engaged in the trade of exhaustible natural resources.

It is the confused outlook for world trade and investment in exhaustible natural resources which explains the inclusion of ten rather terse paragraphs, proposing an International Resources Bank (IRB), in the 1976 Nairobi speech of Dr. Kissinger.¹⁷ The "many advantages and new concepts" of this proposal, according to his proponent, are the following:

- 1) The IRB would be a kind of "honest broker" between host countries and foreign investors, encouraging both equity and project development;
- 2) Its participation would reduce non-commercial risks, promoting investment;
- 3) Deals would feature production-sharing, apparently not unlike the co-production schemes of socialist countries;
- 4) Projects could be financed by issuing bonds secured by a specific commodity, and they could be retired by delivery of a specific commodity. The IRB could guarantee these financial instruments against non-commercial risks. It is argued that the bonds would be a fruitful new international instrument for forward purchases of commodities, while providing added assurance for access to both markets and supplies;
- 5) The IRB would encourage the progressive acquisition of technology by the host country.

The IRB would not invest its own equity in projects, although it could act as an agent in selling bonds issued by the project entity. The primary function of the IRB will be to guarantee project investment finance against non-commercial risk. Regardless of host country equity participation

in the project, the host government would have to participate in the contract for the IRB to join the mining project. It is not expected that the IRB would become involved in further stages of processing such as milling and fabricating.

Proponents of the IRB emphasize that ore bodies being worked in LDCs are often much higher grade than those being developed in the industrialized world. Furthermore, the domain of industrialized countries has been prospected and explored much more intensively than that of the LDCs.

Perhaps the most interesting feature of the IRB proposal is its implicit criticism of past and actual arrangements for world trade and investment in exhaustible natural resources (the proposal excludes agriculture; it is concerned mainly with minerals, although it could also play a role in the energy field.) Its tone is very far from that of not-so-distant U.S. official statements regarding the wonders of laissez-faire in international markets. It admits gross imperfections in commodity, capital and technology markets, and de facto recognizes the crisis in the postwar TNC commodity stabilization regimes. Coming from an official of a capital-exporting and raw material-importing country, the proposal naturally arouses suspicions which would not surprise either readers of Kemp and Jones, who know how capital inflows can lead to immiserizing declines in host country terms of trade, or readers of the history of pre-1914 British overseas investments. But the proposal opens fresh ways of looking at world markets for resources, and candidly admits that wide differences exist between the quality of mineral deposits in industrialized countries and in LDCs, implicitly accepting LDC claims to at least Ricardian rents. Indeed, it is a somewhat backhanded tribute to those in the LDCs who have called for a New

International Economic Order, without whose persistent claims proposals such as that for the IRB would have never come to pass.

It is unlikely that a new world order for trade and investment will spring full grown from anyone's brow, nor that anything as thorough as the Havana Charter will be forthcoming in the near future. The search for a new order is likely to be a complicated process, made up of several strands. We now turn to examining some of these strands.

Contracts

In spot auction markets contracts between parites can be fairly precise, but are usually superfluous, unless lags between agreement and delivery are long. In customer markets it is difficult to pin down the substance of the relationship between the parties in a legal document, particularly when the parties are from different countries. The legal-economic history of contractual arrangements between TNCs and LDCs has also been plagued by emotional rhetoric, often forthcoming from private and public lawyers from industrialized countries, proclaiming the importance of "international law" against what is seen as LDC inability to respect contractual obligations. From recent years, incidentally, one can recall impassioned defenses of the "rule of law" against alleged LDC encroachments on the rights of TNCs from individuals later involved in legal problems of their own, having to do with the Watergate matter, as well as from TNCs later shown to have engaged themselves in rather peculiar practices. In LDCs, sometimes weak governments have not dared to release the full text of contracts with TNCs, for fear of public opinion outbursts.

A more analytical approach to the history and realities of LDC-TNC

contracts, however, has already begun, in spite of the difficulty of having access to the relevant documentation.¹⁸ This approach recognizes, first of all, that in the past many concession agreements have contained provisions which no sovereign government could realistically be expected to tolerate for a substantial period, forming part of the sad history of unequal treaties imposed on LDCs by hegemonic powers. Concessions in perpetuity or 99 years, control by TNCs of vast land areas, etc., would be included in what now can be regarded as unrealistic in most LDCs, even if they still can be found in some industrialized countries.

The new approach also recognizes that concessions disputes between LDCs and TNCs are inevitable. They may arise from different interpretations of complex provisions in a contract, or from changing circumstances which make clear contractual provisions grossly unrealistic. Even for the case of OPEC-TNC dealings during the 1970s, which are often given as an example of LDC inability to keep agreements, Edith Penrose has noted: "I think the evidence indicates that, although power had shifted, most of the governments wanted in good faith to reach agreement with the companies; they made concessions to do so and did not lightly abandon the agreements reached. But the fall in the value of the United States dollar, in terms of which prices had been set, combined with unexpectedly high rates of international inflation and unexpectedly rapid rises in the market prices of oil in 1972 and 1973, created circumstances that undermined the basis of the agreements by vitiating the expectations that were held by both companies and governments at the time when they were made. Renegotiation became essential if the agreements were reasonably to serve the mutual interests of the parties."¹⁹

As noted by Raymond Vernon in his pioneering work, there are inexorable cycles in the bargaining strength of TNCs and LDCs. When a TNC first goes into an LDC to look for a deposit, its bargaining power will be at a peak; unless the LDC government is quite sure that there are deposits of reasonable quality within its territory, it will have little leverage even if there are many TNCs as potential investors. Concessions at this point will be generous. Even when the TNC favored with a concession finds a deposit, its bargaining power will remain high, as the proper technology as well as transportation and marketing arrangements may yet to be established. Asymmetrical access to information as between TNC and the host government will still be a fact of life; the latter, for example, is likely to have only a vague notion of what unit costs of operation are. Only when the operation is a going concern and a success will the bargaining power tilt in favor of the host country. In retrospect, early concessions will appear as excessively generous, if not to the government which negotiated them, then to the opposition eager to find an issue tying its political enemies to the seldom popular TNCs. It is in the nature of things that TNCs will press their early advantage, while the host country will press their advantage later on. It is not obvious that there is much to be gained either by TNC restraint early in the process, nor for LDC government restraint later on, from their respective viewpoint.

Lamentations and exhortations are unlikely to change the dynamics of this cycle, which is based on a sharp break from a situation of great uncertainty, asymmetries and little TNC commitment, to a situation of much more information, symmetry as well as large TNC investments in situ.

Recognition that conditions underlying most agreements are likely to change, suggests the desirability of institutionalizing contract changes, as argued by Smith and Wells. This could be done by including in the contract clauses calling for automatic, non-negotiable adjustment of certain terms (such as progressive reduction of concession area, or phase-in of host country ownership), or by including clauses providing for the future renegotiation of selected terms. This mechanism could work better than arbitration provisions, which have a dubious record regarding either equity or effectiveness, and which in many parts of the third world are regarded as unacceptable impositions on national sovereignty, unless they involve local courts and local law.

The notion of contracts as a kind of framework for an ongoing relationship is unlikely to avoid many disputes, but could generate, as put by Smith and Wells, brief periods of harmony between points of negotiations which may be well worth striving for. Anything more ambitious in this area must await the evolution of firmer and more equitable bases for true international law, to be distinguished from what in the past was unilaterally determined under that rubric by hegemonic powers.

There is a growing literature on the tactics of bargaining over new and old contracts, which include advice on who should be present in the bargaining room, whose secretaries should type drafts, etc. Much of this literature draws on that on collective bargaining between trade unions and their employers. Rather than go into it, it may be best to focus on key economic issues over which the bargaining struggle takes place. One last remark before going into those issues: both the literature and the practice of bargaining point out the uses of "wild men" to extract concessions from the other side. Often best results can be achieved for the side with "wild

men" if they are not particularly well informed and have unrealistic expectations about the value of what they have to offer.²⁰ This, of course, does not help in the search for a quiet life and smooth international relations. Perhaps less troublesome for a peaceful international polity is the increasing willingness and ability of LDCs to exchange information among themselves regarding contracts with TNCs.

Taxes

For many direct foreign investments, taxes represent the major benefit for host countries. In the area of exhaustible natural resources, which typically generate modest employment and linkages, taxes can be the only significant benefit. "Taxes" will be defined broadly in this section, to cover for example the tax-equivalent value of output-sharing arrangements.

The object of taxation policy, viewed from the side of the host government, should be simple: it is to capture all of the Hotelling and Ricardian rents, while letting the investor make the rate of return necessary to induce him to come in. Under competitive conditions in a world of certainty, such a policy would be easy to implement. Mining rights could be auctioned off, or excess profit taxes could cream off rents, or other schemes could achieve the desired objective. The prevalence of large, unique projects in mining suggests that case-by-case taxation which squeezes all rents for the host government would be an administratively feasible possibility. But uncertainty and conditions far from competitive complicate matters. On the one hand, besides Hotelling and Ricardian rents, there might be oligopoly excess profits to share. But uncertainty makes rents and profits difficult to predict, and raises bankruptcy fears for the investors. Accounting problems also arise, exacerbated by the lack of open competitive markets yielding

arms-length quotations against which intra-company pricing can be checked. The pricing of the services provided by the social overhead capital of the host country can also raise accounting headaches.

Host countries with weak administrative machineries and eager to obtain tax revenues with some degree of certainty have historically relied on royalties levied as so many dollars (or whatever) per metric ton of mineral extracted or exported. Any beginning student of price theory could show why this crude output or export tax is inefficient, but its simplicity and ease of administration are appealing. Output will fluctuate less than profits, so the government will also thrust a greater share of risks onto the investor with this tax.

The next step in taxation is likely to be the introduction of some sort of profit tax, either written especially for mines, or as part of a general profits tax in the host country. It may or may not be accompanied by excess profit taxes, designed to increase the government cut at times of bonanza. It will be difficult to fine-tune such taxes so that all rents plus excess profits, no more and no less, are siphoned off by the host government. Unit costs will be uncertain to the TNC, particularly at the start of operations in a new mine, while the supply price of international capital for that specific industry will be only fuzzily known to the host governments. Both TNC and host government will share many doubts about the future of world markets. The problems surrounding intra-company pricing will create constant friction between the parties. At times the taxes will appear as too high, and will be charged with repelling foreign investors; at other times companies will be seen as making a killing, which perhaps they share with foreign governments and customers. At neither time publicly available

data are likely to settle the issue (many years later perhaps they will, but only some scholars will care then).

These difficulties with profit and rent taxation have led to new arrangements, such as those pioneered outside the Socialist countries by Indonesia and Peru in oil, involving service contracts which share output instead of profits. In the Peruvian case, the aim of the state corporation, PETROPERU, was to emphasize Peruvian sovereignty over the resources while seeking simplicity. The key is a fifty-fifty split of the oil at the well-head. As noted by Shane Hunt, this assures the host country that in no case the implicit profit tax will fall below 50 percent, but it also implies that the tax rate can be much lower if oil prices rise significantly, or the companies which signed the contracts (Occidental in this case) hit spectacular deposits. But the risk is shifted to foreigners, with PETROPERU committing itself to no capital outlay, while pushing Occidental to develop rapidly the assigned area. Shane Hunt concludes that: "Output sharing contracts probably obtain foreign capital and technology in as antiseptic manner as possible. Their only danger is that they shift the risk all too well."²²

A host country without pressing fiscal needs, confident of its administrative machinery and its ability to control phony intra-company pricing may try what has been labelled a "Resource Rent Tax."²³ Assuming a supply price of capital for that activity, the value of the cash flow each year could be calculated for the project, accumulating negative balances (likely to occur during the early years) at a rate equal to the assumed capital supply price. Positive values would then be taxed at one or various escalating rates. To keep the TNC interested in minimizing costs, those rates would never reach 100 percent. Advocates of this tax argue

that by reducing the risk of loss to the investors, who effectively will enjoy a "tax holiday" whose duration will be inversely related to the actual profitability of the project, it will allow host governments to raise expected tax yields without discouraging capital inflows.

A somewhat related tax has been put into practice in Papua-New Guinea, for a project involving the Bougainville Copper Limited, which is subjected to a 33.3 percent company tax on earnings up to a 15 percent return on agreed capital, to which a marginal tax rate of 70 percent on additional earnings is added. However, the calculations are done on a year-to-year basis, with no provision for carrying forward any shortfall of profits below the 15 percent return on agreed capital, to count against possible future excess profits, as in the Resource Rent Tax proposal.²⁴

During 1974 Jamaica imposed additional taxes on its bauxite industry, this time on output, but expressed in value terms.²⁵ As an arms-length price for bauxite is not available, the tax was geared to the price of aluminum ingot. A minimum level of production, somewhat over 90 percent of capacity, is also assumed for tax purposes. If production falls below the stipulated level, the scheme is in fact a lump sum tax. With this action, Jamaica has certainly increased its share of the pure rents generated by its bauxite industry, which for Caribbean producers include a significant amount generated by their proximity to the major market. It is more debatable whether it has captured 100 percent of those rents, and whether it has eaten into the oligopolistic super-profits of the far from competitive aluminum producers. It would take remarkable economics to argue that consumers of aluminum have been so far the major losers from the Jamaican actions.

Auctioning exploitation rights was mentioned earlier as a

theoretical device to assure host countries of all rents from mineral deposits. Why is this not done more often? Simply because when one goes to look at a specific project the potential number of interested parties narrows down sharply. This, in turn, is caused by lack of complete information regarding what is being auctioned off, by both government and companies. Firms are unlikely to explore without assurance that they will be able to exploit successful discoveries, so in practice some exploitation rights must be given to firms which will engage in prospecting. In other cases, complementaries in production act to further narrow down available candidates. Shane Hunt relates how the Peruvian government sought potential entrants from Europe, Japan and the U.S.S.R. into the development of its Cuajone deposit. "Few companies possess familiarity with the technology of open-pit copper mining. Fewer still have access to the enormous amount of capital required. Moreover, the potential difficulties of sharing transport, refinery, and export facilities with Southern Peru in its adjacent Toquepala deposit essentially ruled out the entry of a new company. The choice available became clear: it was Southern Peru or nothing."²⁶ In the case of oil, contemporary circumstances make the auctioning option more feasible. A relatively wide diffusion of oil drilling technology plus relatively easy marketability for oil contribute to this result.

Perhaps the simplest way for a host government to make sure that it is capturing all rents from mineral exploitation is to run the mines itself. What needs explaining is why many radical third world countries have stopped short of this solution to the taxation problem. One answer is that the generation of rents cannot be taken for granted, i.e., the efficient operation of mines may require skills not yet available in host countries. In some

cases, secretaries as well as engineers may be in short supply. To this one should add that the alternative of nationalization plus selective hiring in world markets by the LDC government of the inputs missing locally has advanced slowly partly due to the weaknesses in world markets for some of those inputs, particularly technological ones, and partly due to the difficulty of combining efficiently those disparate inputs. But as LDC national companies gain experience, and broaden the demand for specialized services, this situation is likely to change, making the nationalization solution increasingly attractive.

In some cases, LDC reluctance to nationalize may come not from lack of technological self-confidence, but from a desire to maintain the oligopolistic structures built up by TNCs in the past, and to increasingly share in oligopolistic super-profits. If one assumes that in the past parent governments directly shared in those super-profits only by taxing the meagre declared "downstream" earnings of their TNCs, the taxation problem now becomes more complicated, as emphasized by C. Fred Bergsten. The zero-sum-game features of the situation point to sharp conflict, or "investment wars," unless clear international rules are agreed upon.

National Control, Training and Linkages

Less tangible but no less important than the struggle for a higher share of mining rents and profits is the LDC search for greater national control over their mining industries, which often generate high percentages of their Gross National Products and even higher shares of foreign exchange earnings. The rationale for such a desire is well known, and is increasingly accepted. Here it will be sufficient to stress the

point that even total nationalization will not insure national control (defined in some commonsensical fashion) over the mining activity unless formal ownership is accompanied by detailed knowledge of its operation both at the production and the marketing ends. Knowledgeable "hired hands" can get away with much without even ensuring efficiency if the owners lack mastery of technical and economic details. This applies, a fortiori, in joint ventures where nationals sit on the board of directors with foreigners. At the very least special technical committees staffed by experts independent of the foreign partner should be used under those circumstances to advise national members of the board of directors.

It may also be noted that in spite of some torrid first world rhetoric, in actual practice compensation has been paid in the majority of nationalizations, usually based on book value, which has increasingly been accepted as the standard for settlements. Often governments have paid foreign investors for the shares purchased out of future dividends. Programmed changes in ownership became fashionable in the early 1970s, although as noted by Smith and Wells,²⁷ the concept appeared in much earlier agreements, in the form of host country options to buy shares at a later date. These authors speculate that future arrangements may build in put-options by foreign investors if and when domestic ownership reaches a certain percentage of equity.

The training effects of gradual nationalizations can be strengthened by provisions calling on the partner TNC to set up minimum employment quotas for nationals, in different employment categories, as well as by fellowships for the study abroad of young people of the host country. One can conjecture that there is some tax payment which would be equivalent to the additional

burdens placed on the TNC by such training requirements. Simplicity would call for consolidating bargaining over taxes alone, but both host countries and TNC seem to prefer to spread their interaction over a broader area, including the enlisting of TNCs to help LDC efforts to diversify into industries related to their natural resources.

Besides the aspiration of control over mineral resources, LDCs where the mines are located have for many years been eager to expand some backward and forward linkages of those operations with their national economies. Linkages have been limited partly for purely economic and technical reasons: inputs required by the mines are frequently sophisticated manufactured goods, while the further processing and refining of ores may be best located near large customers. But distortions in the world economy have also deprived LDCs of a larger share of manufacturing activities servicing mines or processing their output. Perhaps the easiest one to recognize is that involving escalating tariffs in industrialized countries, which yield substantial effective protection to their processing activities. More subtle distortions would include the packaged sale of inputs by branches of the same TNC exploiting the mine, or by related foreign firms. Here one can find "customer relationships" which may make sense from the viewpoint of the TNC, but not necessarily from that of the host country. Locating processing plants away from the LDC providing the raw material may also be part of TNC strategy to reduce risks and increase its relative bargaining power. Placing the refinery in such an LDC could mean giving up the flexibility the TNC obtains by having more than one source of supply for its downstream operations. Costs to LDCs of a breakdown of its links to TNCs are raised: to this day Cuban efforts to expand nickel production are hampered by inaccessibility to

the Port Nickel refinery, originally built in Louisiana by the Freeport Sulphur Company to process the difficult Cuban lateritic nickel-bearing ores.²⁸

Maximizing all linkages from mining operations remains, however, a dubious economic strategy for LDCs. In some cases, LDC resources may best be employed in activities totally unrelated to the mines. Indeed, traditional attacks on enclaves within LDCs have been muted by recognition that some undesirable spillovers from activities run in cooperation with foreign capital can be minimized precisely by enclaves. Demonstration effects in luxury consumption, in wage claims, and in politics may best be held in check when the mining operation is tucked away in some remote part of the LDC, and its interaction with the national economy only goes through a few well controlled channels. Remoteness from population centers is a clear advantage when the mines and refineries pollute or disfigure their surroundings.

Both world efficiency and equity could gain by greater LDC processing and marketing of minerals, and by their providing a greater share of the inputs to the mines. Forward and backward integration may under some circumstances be a necessary ingredient in LDC efforts to expand their bargaining power in world markets. An increasing share of LDC minerals and fuels is likely to be marketed directly by LDC organizations, cutting out the foreign middleman. But one worries that LDC enthusiasm for pushing some of these activities could generate inefficiencies. Processing can be very capital-intensive, as well as skill-intensive, and may not be the best investment LDCs can make. An oil exporting country, in other words, may do better than investing in a fancy petrochemical complex.

Neglected Issues and Some Conclusions

A listing of issues neglected in this paper may be useful. The focus on LDCs kept us from inquiring about mineral policies of small industrialized countries, such as Australia, Canada, Ireland and Norway, as well as those of socialist countries. Their experiences in dealing with TNCs, the Soviet ventures in Siberia, etc., may yield insights not forthcoming from an exclusive focus on LDCs.²⁹ The topic of cooperation between LDCs and socialist countries in mineral technology is also intriguing. While socialist countries have called on TNCs for technological inputs in some areas, they may nevertheless be alternative sources of technology in others. The U.S.S.R. may not be able to help Cuba much in the development of lateritic nickel-bearing ores, but its contribution may be more important in the exploitation of the Masqalah phosphate deposits in Morocco. Intra-LDC cooperation may also grow, as national enterprises gain in experience. It remains to be seen whether the relations between, say BRASPETRO and Iraq, will be more harmonious than those between Iraq and older TNCs.

The paper analyzed LDC pressure for capturing greater shares of mineral rents and profits, but it has said nothing as to how those gains will be allocated within each LDC. A variety of outcomes is not only easy to imagine, but likely. One could speculate about the link between bargaining zeal and the manner of distributing internally the fruits of bargaining. Several LDCs groups could be isolated: the ruling group, the mine workers, the state bureaucracy, the poorest fifty percent of the population. How increasing national control over natural resources touches each of them will differ between Algeria and Saudi Arabia, between Iran and Cuba.

Many LDCs are poorly endowed with fuel and mineral resources.

Tests of strength among industrialized countries, mineral-rich LDCs and TNCs will have important repercussions to those poorly endowed LDCs, a matter which has received little analytical (in contrast with propagandistic) attention.

The consequences of TNCs and minerals for the distribution of economic and political power within developed countries is another neglected topic. The growing debate within the United States regarding the desirability of breaking up oil TNCs indicates the importance of the issue. Industrialized country policies regarding strategic stockpiles of fuels and minerals, and how such stockpiles have influenced markets, have not been analyzed.

Mining the "commons" of mankind, such as the sea bottoms and Antarctica, has been mentioned as a clear case where international markets, as presently arranged, would yield inefficient results, also unlikely to be equitable. How to remedy the lack of clear property titles, the role of TNCs and how to distribute the growing scarcity rents generated by the "commons" has been left for others to explore. One may notice, however, that potential remedies include taxes which can improve efficiency in resource exploitation while generating resources which could be channelled to reduce poverty. This is one of those rare situations where both efficiency and equity could be served by taxes.

The controversy over the limits to long term growth which may arise from finite stocks of natural resources has been ignored in this paper. It is well known that either optimistic or pessimistic models can be built by choosing suitable assumptions regarding technological progress, factor substitution or population growth. The choice of assumptions depends much on one's animal spirits.³⁰

The paper has laid great stress on the technical and political difficulties hampering the smooth functioning of international trade and investment in minerals. The skeptical reader may suggest that many of the points made to support this view apply equally well to all international markets. It may in fact be difficult to demonstrate statistically that international markets for oil, uranium and gold have historically been less perfect than those for coffee and machine tools. Peering into the future, one can at least argue that policy makers are likely to continue perceiving international markets for most exhaustible natural resources as more imperfect than others. The United States proposal for an International Resources Bank, for example, stresses that world investment is being inefficiently allocated, with too little going to exploit LDC mineral deposits, due to fears of non-commercial risks. LDCs engaged in mineral production, on the other hand, are hardly satisfied with world markets as they are. Grumbling and agitation of this sort on both sides does not seem as great for other markets.

Movement toward more efficient and equitable international markets in this area is unlikely to be possible in isolation from movements in that direction in other international markets. Reasonably efficient world markets for technology and capital, for example, could do much to improve markets for exhaustible natural resources. It is a virtue of demands for a "New International Economic Order" that they emphasize the need to look at world markets in their totality, something not done since the days of the debate over the International Trade Organization.

Elsewhere, I have argued the case for international economic relations which are standoffish, decomposable and reversible, for a world of nation states which desire to maintain their autonomy and yet benefit

from the international division of labor.³¹ Reasonably open and competitive markets working under clear and internationally agreed rules of the game are still the best bet for achieving movement toward such goals. Those markets have not existed in the past for minerals, and are unlikely to emerge spontaneously, or persist when they do. It was seen earlier that high doses of "customer relationships" are likely to characterize markets in minerals, making trade and investment in minerals less standoffish and reversible than in cotton or steel. But one could imagine international rules promoting movement in the desired direction, particularly regarding closer vigilance of TNCs engaged in restraint of trade practices, establishing Keynes-ITO commodity stabilization agreements in selected areas, and encouraging long term arm's length contracts of the type negotiated between Australia and Japan. With a minimum of trust between the parties, such contracts can provide a viable alternative to vertical integration and yield both relative security of supply and sales. Fuels and minerals are fairly homogenous and unchanging commodities not plagued by product differentiation, repair needs, etc., which make clear contracts problematical for many manufactured goods, such as machinery.

Changes in the structure of world trade and investment in non-renewable resources will remain traumatic and complicated. Those whose comfortable positions are threatened by those changes, particularly TNCs, will no doubt warn about the danger of killing the goose that lays the golden eggs. This goose has cried wolf many times before, yet is alive and robust, thanks partly to its remarkable adaptive capacity. Adaptation will also be necessary for those who prefer to buy their fuels and minerals just from TNCs which speak their language. But the cultural adjustments required

to be comfortable relying directly on Africans, Asians and Latin Americans for one's fuels and minerals should not be so difficult. After all, there will not be many cheap alternatives to it in the future.

Footnotes

* Earlier versions of this paper benefitted from comments and criticisms from James H. Cobbe, Benjamin I. Cohen, Richard N. Cooper, Charles P. Kindleberger, Assar Lindbeck, William D. Nordhaus; and Vahid Nowshirvani. Thanks are also due to Gail Ross for editing and typing, and to commentators at the New York University Conference on Economic Issues of Multinational Firms, held November 1976.

¹H. Hotelling, "The Economics of Exhaustible Resources," Journal of Political Economy (April 1931). Among recent contributions one can mention Robert M. Solow, "The Economics of Resources or the Resources of Economics," The American Economic Review 64, no. 2 (May 1974): 1-14; John A. Kay and James A. Mirrlees, "The Desirability of Natural Resource Depletion," in The Economics of Natural Resource Depletion, edited by D. W. Pearce with the assistance of J. Rose (London and Basingstoke: The Macmillan Press Limited, 1975), pp. 140-176.

²Robert M. Solow, "The Economics of Resources or the Resources of Economics," p. 6.

³Robert M. Solow, "The Economics of Resources or the Resources of Economics," p. 10.

⁴More generally, the evidence for the United States during 1870/1900 to 1957 shows that unit costs of minerals have fallen relative to manufacturing and agricultural unit costs, as well as absolutely. See Harold J. Barnett and Chandler Morse, Scarcity and Growth: The Economics of Natural Resource Availability (Baltimore: The Johns Hopkins Press, 1963), pp. 8-9. These

authors optimistically conclude: "Thus, the increasing scarcity of particular resources fosters discovery or development of alternative resources, not only equal in economic quality but often superior to those replaced" (p. 10). In one of their few references to LDCs in the book, the authors note less optimistically for LDCs: "During the past generation or two, technological advances and economic policies in the industrial countries may have worked against the interests of the less industrialized countries more often than in their favor . . . [T]he tendency of technological advance to make natural resources more homogeneous. . . reduces the actual or potential value of high quality natural resources that once were essential for industry. Since the unexploited reserves of rich mineral resources are located mainly in the less industrialized countries, these countries are harmed, not helped, by such technological developments" (pp. 259-260).

⁵See the story "Texas sets December oil output at 99%; cut is bid to send Washington a message," The Wall Street Journal (Friday, November 19, 1976): 12. The front page carried news of the OPEC meeting in Vienna.

⁶In the sense defined by Arthur Okun, "Inflation: Its Mechanisms and Welfare Costs," Brookings Papers on Economic Activity 2 (1975): 351-390.

⁷R. G. Hawtrey, Economic Aspects of Sovereignty (London, New York, Toronto: Longmans, Green and Co., 1930), pp. 139-140 and p. 146.

⁸See A. M. Spence, "The Economics of Internal Organization: An Introduction" and K. J. Arrow, "Vertical Integration and Communication," both in The Bell Journal of Economics 6, no. 1 (Spring 1975): 163-172, 173.

⁹Louis Turner, "The Oil Majors in World Politics" (Royal Institute of International Affairs, 1976), mimeograph, p. 7.

¹⁰James Chace, "American Intervention," The New York Times (September 13, 1976): 27. Mr. Chace is Managing Editor of the Journal of Foreign Affairs.

¹¹See Saburo Okita, "Natural Resource Dependency and Japanese Foreign Policy," Foreign Affairs 52, no. 4 (July 1974): 714-724.

¹²See Theodore H. Moran, Multinational Corporations and the Politics of Dependence: Copper in Chile (Princeton: Princeton University Press, 1974), p. 22. Shane Hunt asserts: "Virtually everywhere in the Third World concessions as they were written twenty years ago were giveaways," in his "Direct Foreign Investment in Peru: New Rules for an Old Game," in Abraham F. Lowenthal, editor, The Peruvian Experiment; Continuity and Change Under Military Rule (Princeton: Princeton University Press, 1975), pp. 346-347.

¹³There is another case, of at least theoretical interest, for LDC-TNC joint maximization. Suppose an LDC has many small mines each with rising marginal costs for the same mineral. Each mine is owned by a different, price-taking producer. Suppose further that a single TNC buys the mineral from the mine owners. Joint maximization by the TNC and the mine owners will be more profitable than the arms' length (monopsonistic) solution. The argument has been developed by Richard N. Cooper, in "Nationalization vs. Vertical Integration in Extractive Industries," mimeograph, May 1972. See also Chapter 2 in Raymond F. Mikesell, Editor, Foreign Investment in the Petroleum and Mineral Industries; Case Studies of Investor-Host Country Relations (Baltimore and London: The Johns Hopkins Press, 1971).

¹⁴"Certainly, resource owners have become increasingly monopolistic over time, the most notable example now being the oil cartel OPEC, but, with cartels and oligopolies being formed in rock phosphates, bauxite and copper,

the trend is a general one." Editorial introduction of The Economics of Natural Resource Depletion, op. cit., p. 17.

¹⁵Robert Clower and Axel Leijonhufvold, "The Coordination of Economic Activities: A Keynesian Perspective," The American Economic Review 65, no. 2 (May 1975): 185.

¹⁶For oil, see Morris A. Adelman, "Oil Companies as OPEC Tax Collectors," Foreign Policy (Winter 1972-73); for copper see Theodore H. Moran, Multinational Corporations and the Politics of Dependence: Copper in Chile (Princeton: Princeton University Press, 1974).

¹⁷The reference is to the document distributed by the United States Department of State. The speech was given on May 6, 1976. Since then, the U.S. State Department has provided further information on the IRB proposal, which is used in the following paragraphs.

¹⁸See David N. Smith and Louis T. Wells, Jr., Negotiating Third World Mineral Agreements; Promises as Prologue (Cambridge, Mass.: Ballinger Publishing Co., 1976); and Theodore H. Moran, Multinational Corporations and the Politics of Dependence (Princeton: Princeton University Press, 1974), especially Chapter 6.

¹⁹Edith Penrose, "The Development of Crisis," Daedalus 104, no. 4 (Fall 1975): 53-54.

²⁰I owe this point, among others, to James H. Cobbe, who is writing his Ph.D. thesis on investments in natural resources at Yale University.

²¹I follow here Shane Hunt, "Direct Foreign Investment in Peru: New Rules for an Old Game," in Abraham F. Lowenthal, editor, The Peruvian Experiment; Continuity and Change Under Military Rule (Princeton: Princeton University Press, 1975), especially pp. 335-336.

²²Shane Hunt, "Direct Foreign Investment in Peru: New Rules for an Old Game," p. 337.

²³R. Garnaut and A. Clunies Ross, "Uncertainty, Risk Aversion and the Taxing of Natural Resource Projects," The Economic Journal 85, no. 338 (June 1975): 272-287.

²⁴M. L. O. Faber, "Bougainville Re-negotiated--An Analysis of the New Fiscal Terms," Mining Magazine (December 1974). Interest payments also continue to be allowed as a cost. Adjustments are allowed for abnormal inflation, exchange rate fluctuations and new tax regulations. I am grateful to James H. Cobbe for explanations on the Bougainville arrangement.

²⁵This paragraph relies mainly on Malcolm Gillis and Charles E. McLure, Jr., "Incidence of World Taxes on Natural Resources with Special Reference to Bauxite," The American Economic Review 65, no. 2 (May 1975): 389-396. See also Helen Hughes, "Economic Rents, the Distribution of Gains from Mineral Exploitation, and Mineral Development Policy," World Development 3, nos. 11 and 12 (1975): 811-825.

²⁶Shane Hunt, "Direct Foreign Investment in Peru: New Rules for an Old Game," pp. 326-327.

²⁷David N. Smith and Louis T. Wells, Jr., Negotiating Third World Mineral Agreements; Promises as Prologue (Cambridge, Mass.: Ballinger Publishing Co., 1976), Chapter 5.

²⁸See Theodore H. Moran, "The International Political Economy of Cuban Nickel Development," mimeograph, Johns Hopkins School of Advanced International Studies, 1976.

²⁹Helen Hughes has argued that there is no link between a country's level of development and its mineral policies. Helen Hughes, "Economic Rents,

the Distribution of Gains from Mineral Exploitation, and Mineral Development Policy," p. 817.

³⁰For a clear review of this controversy as well as of global environmental issues see William D. Nordhaus, "Energy and Economic Growth," in J. C. Hurewitz, Editor, Oil, the Arab-Israel Dispute, and the Industrial World; Horizons of Crisis (Boulder, Colorado: Westview Press, 1976), pp. 266-282.

³¹"North-South Relations: The Economic Component," International Organization 29, no. 1 (Winter 1975): 213-241.