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PROBLEMS IN OBTAINING ADEQUATE RETURNS
FROM RESOURCE INDUSTRIES

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The views expressed in this paper are those of the author.
They do not therefore necessarily represent those of the Department of Planning and Economic Affairs or of the Government of Liberia.

PROBLEMS IN OBTAINING ADEQUATE RETURNS FROM RESOURCE INDUSTRIES

Before I prepared this paper I had the advantage of reading the papers by Dirk Wolfson on Fiscal Policy and Economic Development, by Fred Hanga on the Development Budget, and by Rex Wait on Some Practical Aspects of Development Budgeting. These papers give admirable coverage to many of the topics that I had hoped to deal with, and have, in fact, left me with little to say except on the general theoretical problems of obtaining adequate returns from natural resources, and some more practical aspects arising from many experience in dealing with concession holders in the field of natural resources.

Before beginning my topic proper however, I would like to express mild disagreement with one aspect of these papers. To me, the most important conceptual development in the field of fiscal policy has been a growing awareness over the past thirty years of the role of the government through its expenditures on the one hand and its receipts on the other. The modern role of the State requires the government to undertake a balancing programme by which its tax and borrowing powers broadly defined on the one hand and its expenditures on the other, ensure that the economy moves towards a desired constellation of prices and quantities for factors and products in a smooth and efficient way.

Of course public sector expenditure programmes can only be carried through if factors and products are available in the amounts required and at the time when they are needed. But there is a great deal

of value in considering the public sector as a competitor of the private sector, bidding away resources from undesirable uses in order to ensure that desirable programmes are carried out. In the same way there is a great deal of value in looking upon the government's tax and borrowing programmes as the means by which the factors and products required by government are freed from private sector demands. In a world of certainty with perfect knowledge, the ideal tax and borrowing system would be that which just freed precisely those resources required to meet the demands for factors and products in the public sector; and one major purpose of planning is to ensure, as far as is humanly possible, that this is the result of government programmes on both the revenue and expenditure sides. It seems to me from reading the papers which have so far been presented that insufficient attention is being paid to the design of a tax and revenue system which will ensure that the factors and products which are needed for public sector and desired private sector programmes are released in the right quantities and at the right times. In other words, one could hope that the doctrines of the intensive and extensive margin would be applied to the analysis of expenditures and revenues. Too often most of the attention is devoted to the resources which are required for development, particularly those needed if the public sector development programme is to be carried out. Not enough attention is given to the actual resources - factors and products - which are likely to be released by the tax and borrowing programmes of the government. In an over-simplified way the sort of problem that I would

like to see given more attention is the extent to which tax and borrowing policies can release the resources needed for development. In the long-run, given some degree of substitutability between factors and products, and some flexibility in transformation ratios one could expect the desired balances or equilibrium to be achieved in product and factor markets by assuring merely the savings/investment balance and the foreign exchange balance. But assuring aggregate balance is not a sufficient condition for solving problems of balance in the short-run. I find it hard to see how a general increase in taxes, for example, which would free labour from private sector demands, will necessarily free the teachers, doctors, engineers and technicians who are required by the public sector programme.

Too often economists devote most of their attention to the demands for real resources which the public sector programme is expected to make, and in improving their estimates of these demands. Too often insufficient attention is paid to specific revenue instruments which would ensure the release of the precise resources required. This imbalance is pretty clearly demonstrated by the enormous strides which have been made in performance and programme budgeting by countries which have little information about and few analytical devices to discover the impact of their revenue instruments on the release of resources. Some more detailed consideration of the real resource effects of tax and borrowing programmes seems to be called for, and I commend this suggestion to the Liberian authorities.

In a general way I of course agree with the views expressed in the papers referred to above about the need for consistent policy to encompass all receipts to the government whatever their form - whether taxes, licences, fees, rental of government property, or borrowing. But it is, I think, extremely dangerous to lump all receipts together too quickly, and in the field of resource management, certainly not until one has determined the appropriate rate to be charged as a stumpage, or a royalty, or a rent, or a severance tax. It seems to me that only by keeping different types of charges conceptually separate can one hope to ensure that their impact on factors and products, and the allocation of these to meet social objectives, will be given the attention needed if unplanned imbalances in factor and product markets are not to be created within what might otherwise appear to be a balanced programme.

The framework within which the exploitation of natural resources, and the charges to be levied against those who utilise them, needs to be viewed is not at all simple. On the one hand the problem of exploiting natural resources is, in part at least, a question of the rate of utilisation over time of an asset and its conversion, by the end of its life, into a new form. This is the type of question to which capital theory applies, and as we all know this is perhaps the weakest and messiest branch of economic theory. But a few generalisations are possible.

If a nation intends to have a continued flow of economic activity - employment, income, consumption - from exploiting a natural resources base, then either the resource base which supports this flow of economic

activity must be perpetuated or the natural resources must be converted over time through investment into alternate forms which will generate these levels of activity. For renewable natural resources the rate of exploitation over time can be related to perpetuating the resource base - that is to sustaining the harvest from the forests, fisheries, from agricultural land, from water power sites. Non-renewable or stock resources however, cannot be handled in this way and involve a decision not only on rates of utilisation but also on conversion to other forms of capital. Thus one of the objects of government policy in a country which relies heavily on non-renewable resources such as minerals and petroleum is to determine the optimum rate of exploitation of these resources and the form in which they will be replaced by man-made assets. This is not made easy when "the resource base" is unknown, as is the case in the field of minerals.

One way of doing this is to attempt to calculate a social depletion allowance which, when reinvested in other forms of assets, will result in the same flow of economic activity. In other words, if one creates a balance-sheet giving the stock of capital available at any time as well as its division among uses, its sources and its durability^{1/} one can

^{1/} The literature on these topics is extensive. The following are standard works: Income & Wealth of the United States: Trends and Structure, Income and Wealth, Series II, ed. Simon Kuznets, for the International Association for Research in Income and Wealth (Cambridge, 1952). See also Simon Kuznets, National Product since 1869 (New York, 1946), and the following publications of the National Bureau of Economic Research, New York: Conference on Research in Income and Wealth, Studies in Income and Wealth, II (1938), XII

attempt to measure the extent to which a change in produced capital compensates for offsetting changes in the quantity of natural resources. Thus, in arriving at net capital formation, some allowance can be made for the social depletion of natural resources. Present measures of the difference between gross and net capital formation inadequately allow for this aspect of capital transformation.^{2/} For these reasons I would argue that national accounts should give considerably more attention to the extent of natural wealth and changes in this total, and should attempt some measure of social depletion as well as capital augmentation. This is particularly true if, as I have argued elsewhere, much of the investment which is measured by traditional measures of capital formation is only useful so long as the depletable natural resources with which it is associated are profitably exploitable.

In the case of renewable resources, the rate of utilisation over time is perhaps more important than short-run concern with and measures of depletion, although even in this case if resources are being depleted by the processes which give rise to income an attempt should be made to correct gross capital formation so that a nation is

1/ continued from previous page (1950), XIV (1951); Studies in Capital Formation and Financing, Occasional Papers 41, 44, and 45 (1954), by Daniel Creamer (on manufacturing), Alvin S. Toslebe (on agriculture), and Israel Borenstein (on mining). The ratio of capital to outlay is studied in quite a different way by Robert N. Grosse in Studies in the Structure of the American Economy, ed. Wassily Leontief (New York, 1953). See also Colin Clark, The Conditions of Economic Progress (London, 1951). See the discussion by Goldsmith in "A Perpetual Inventory of National Wealth" in Studies in Income and Wealth, XIV, 5-73. A similar perpetual inventory is reportedly under preparation in Canada.

2/ In a country which depends heavily on exploiting non-renewable resources, or in dealing with these sectors of an economy, failure to take into account the effect of depletion may seriously affect the usefulness of capital/output ratios as conventionally defined.

is not deluding itself about its future income generating capacity. But in the case of renewable resources there are dangers in adopting too readily and too quickly doctrines of "sustained yield". Renewable resources are often out of balance with respect to sustainable rates of exploitation. By this I mean that stands of timber which have not been exploited have tended to reach an ecological balance in which disease and insect epidemics, fire and natural destruction, death and decay are in balance with new increments of resources. In the cases of forests and fisheries the annual increment to the resource stock will be zero or negligible in a fully mature and stable population. Thus this increment at any point in time can hardly be taken as a measure of the potential increment if the stock were to be adequately harvested. In this case too we have to worry about the intensive and extensive margins - with improved management and the application of time and effort the amount which can be harvested in any one year is highly variable. Getting a mature stand of timber, or a mature population of fish into a condition in which the annual harvest will be both high and sustainable normally involves destroying the ecological balance and over-harvesting particularly of the old and mature members of the population. To some extent rapid rates of exploitation in the short-run to improve the age balance of the population is offset by new growth; in part it can be made up by the application of more intensive management techniques so that it is possible to go to a relatively high rate of exploitation which might not appear to be sustainable but will turn out to be so with improved and more intensive managerial techniques.

It is both difficult and dangerous to be specific about the rules for managing resources without attempting a detailed assessment of the particular resource in its particular setting. But in Liberia these general comments would seem to suggest rather rapid rates of exploitation of timber, fish and agricultural land until such time as the state of the resource has been made appropriate for more intensive types of management, and until there is more concern with maintaining rates of exploitation.

All of this however, is related to a very simple and generalised form of capital theory. A much more important consideration in the short-run relates to the application of the theory of rent to resource industries. The Government of Liberia has, in fact, two separate and distinct roles - on the one side it is the government with all of the rights and duties which this implies. On the other hand it is a very large owner of resources and has the rights and duties of any other owner of property. In an economy which is attempting to use the price system as the major device for allocating resources it is incumbent upon the government as an owner of property to establish prices which will result in the resources being efficiently allocated. I would like to spend a little time discussing just what this means.

In the Nineteenth Century, at the time of controversies about the nature of economic rent, the role of natural resources as a factor of production was well appreciated. Not only did rent feature in the work of Mill and Ricardo, but you may remember that Gustav Cassel actually proposed that they be considered a separate factor of production from land. Certainly by the time of Marshall's Principles in 1890 the

consequences of a landlord improperly renting his land for the allocation of resources was wellknown, and the difficulties caused by being unable to establish and extract rents has featured in the work of H. Scott Gordon, James Critchfield and Anthony Scott in their analyses of the problems facing the fisheries.

The traditional model for allocating resources was that of the business-man who buys or hires the services of the agents of production including land until he has achieved the best combination in terms of expected costs and revenues. Implicit to the model was an assumption of pure competition in the market for factors including land, although this was modified by Joan Robinson, Chamberlain and other writers on imperfect competition. But to a greater or lesser extent almost all writers on production and distribution theory have pictured an economic universe in which the entrepreneur could obtain at a price the agents of production he needed and by increasing the prices offered could bid away resources from their next best use. Where there was a supply constraint the entrepreneur substituted other inputs and paid rents for specific factors for which only imperfect substitutes could be obtained.

Whatever the virtues of this model in describing the way in which factors are normally allocated, it is generally true that natural resources have not usually gone to the highest bidder in the first instance. Land was allocated by legislation, by custom, and so forth. Discovery of oil and minerals has often been a matter of luck with

widespread monopoly elements created in a period of little knowledge. Forest licences have frequently been the result of speculation. Now it might be true that in the very long-run enterprises would be able to purchase these rights however they were originally created. Indeed a market has developed in many countries and the equilibrium depicted by the classical theoretical model wherein high rents, or royalties, or high capital gains were paid to those who hold the rights has tended to emerge. But the experience of the frontier areas of the wealthy countries - the United States, Canada, Australia, South Africa - suggests that it may take half a century or more before any real equilibrium emerges, and it is in this long period that the significant events in economic development take place.

What is of interest to the government of a country like Liberia is not the equilibrium state which eventually emerges, but the situation in the period between the allocation of these rights and the long-run equilibrium. This is particularly true when the resources are national property and the State holds the power of transferring these rights. In these circumstances the State must, as landlord or owner, attempt to extract the economic rent if it is attempting to maximise its receipts from the ownership of land if resources are to be allocated efficiently. Furthermore, if, as is frequently argued, this general equilibrium model has welfare implications and the price system tends to allocate each agent of production to its highest use, then it is imperative on welfare and efficiency grounds that the government establish prices for natural resources which reflect the economic rent.

Not only is rent extraction important in the static case of allocating resources against given uses, but in a more dynamic sense there are additional problems inherent in not extracting rent or in setting up administrative arrangements under which rent cannot be extracted::

(1) In the case of common property resources or of resources where entrepreneurship is free to enter but administrative arrangements are such that rent cannot be extracted (the fisheries, hunting, recreation, riparian transport, trucking) there is a danger of the development or excess capacity and the over-utilisation of other inputs, particularly capital. This arises from the relatively fixed demand for or pool of output and the tendency for most entrants to obtain the average product even if the marginal product of the entry of a bundle of resources is negligible or zero. This is similar to the argument which has been used concerning the extended family working on fixed plots of land in the Far East.

(2) Rent which is not extracted by the government will appear as factor rewards to some other set of factor owners. Normally the unextracted rent appears as profits according to the owners of capital, or as capital gains to the original promoters who obtain the rights to natural resources. Where these excess returns occur they are likely to become

"key contracts" for other owners of the same kind of factors who will therefore require similar rates of return if they are to provide the capital or services required. If the reward shows up as capital gains for the original promoter then the operating entity may not achieve higher rates of return and all that has happened is a transfer of the capitalised rent from the owner of the resource, the government, to the promoter who had for a short time rights to exploit the resource.

(3) Even if other owners of capital do not begin to look upon the rates of return accruing as a result of non-extraction of rent as normal returns it is highly unrealistic to expect that other factor owners, particularly the labour force, will not through the wage bargain obtain some of the rent. This can give rise to the enclave effect in which high rates are paid in one part of the resource industry which tend to spill over into wage determination in other activities and industries and create high cost structures against which the only practical protection appears to be devaluation and export taxes.

(4) One other aspect of not extracting the rent is the internal political consequences by which capital, particularly foreign but also domestic capital, exploiting natural resources becomes a focus for political discontent, for increased taxes, for abrogation of concession

agreements, or in the extreme case for expropriation.

It is possible to put together a general approach to the charges on resource industries from a consideration of capital theory and the theory of rent.

(1) There should be some sort of a minimum charge for resources which is an attempt to measure the social depletion. Ideally this depletion charge should be available through the budget for investment in other types of capital asset, and should be a cost of production to the exploiting firm.

(2) Agreements and arrangements under which the rights to resources are passed to private hands should allow for differential rents so that the rent on the intra-marginal units or on intra-marginal operations can perform its proper allocative function. Too often resources which would otherwise be at the worst marginal are made sub-marginal by the high rates of factor rewards arising from establishing average prices rather than differential rents for resources.

(3) Differential rents should be established on the basis of ex. ante profits and thus should be related to the productivity of the resources in question, they should not be based on ex. post profits as this puts the entire return at the mercy of the efficiency of the firm concerned and the

other factor rewards, and does not stimulate economy in the use of resource inputs. Ideally, one would hope that as the resource input became relatively more expensive, attempts would be made to substitute labour and capital for resources. This, however, will only occur if resources are a cost to the firm on a par with the prices of other inputs.

(4) Charges can be deliberately manipulated to achieve various social objectives, particularly to take account of indiscriminate losses and benefits occurring from resource exploitation.

With respect to the first of these, it is extremely difficult to arrive at a measure of the depletion charge. In one sense it can be measured in connection with the valuation of the remaining assets after a period of production as is done with other capital items. But in a more fundamental sense the depletion allowance should be related to the charge which must be levied against output over the life of an asset to create a new asset which will produce in perpetuity the same flow of income. This concept - maintaining social capital intact - can only be given rigorous meaning in the classical stationary State. Indeed you may recall that Pigou in his book The Economics of Stationary States argued that maintaining social capital intact meant the preservation of capital in identical physical form. Knight on the other hand argued that the capital

quantity and stock need not come into the calculation at all, all that was necessary was a perpetual flow of income. I have done a number of exercises with the Knight concept on the assumption that at the very minimum the social depletion charge should allow for maintaining social capital intact through maintaining in perpetuity a flow of income equal to that which was generated by the exploitation of the non-renewable resource. And of course it is possible to arrive at an approximate measure by calculating the costs of ensuring that a renewable resource capable of generating the same income and/or employment is created when a non-renewable resource comes to an end. In mining, in particular, it is difficult to know much about the life of a mine. Certainly, reserves are of little use in measuring potential life. C.O. Swanson, formerly Chief Geologist for Consolidated Mining and Smelting Company has pointed out, "That the estimates we have for regional reserves do not really give the over-all potential is easily demonstrated by an analysis of the methods used and totals reported from time to time. These estimates are primarily based on the known reserves in the mines and the properties under pre-production development. Any allowance made for further discoveries is likely to be about proportional to the known reserves. As mining companies maintain their reserves at a level determined by production requirements, the net result is that regional estimates reflect mining practice and current or near future production, rather than over-all potential. Consequently, the regional estimates tend to give a figure

for the life of the reserves (at prevailing rates of production) that remains constant from year to year. At their face value, they indicate that production will be maintained indefinitely But it is clear that these estimates are not really of much help in trying to appraise the full potential of a region or the rate of production in the more distant future. . . . For a time, development may even find more ore than is being mined, thereby increasing the reserves. If such results continue and cause a large increase in reserves, action is likely to be taken in the way of expanding the production rate".

"The total potential of a mine can be estimated accurately only when it has reached a period of old age (when the amount of new ore found each year has dwindled to little or nothing)".^{3/}

Such a calculation depends on detailed knowledge of alternatives which is not easy to satisfy, and on an assessment of whether or not alternative resource-based activities are sub-marginal or not. This rather complex problem is related to whether or not an economy is in fact in equilibrium. I think we can all agree that in the static sense in which classical equilibrium concepts are used equilibrium means that all unexploited resources are sub-marginal, whereas in any actual dynamic case there are likely to be a substantial number of opportunities which are commercially viable. If one associates

^{3/} "Evaluation of Ore Deposits", Transactions of the 9th British Columbia Natural Resources Conference, Dept. of Lands and Forests, Victoria, B.C., 1956, pages 410-412.

the depletion allowance with the costs of brining these extra-marginal opportunities to fruition social depletion is likely to be understated.

In any event, it will be clear that calculating a social depletion allowance involves a detailed knowledge of the resource base, something which is not usually available in a developing country.

Items 2, 3 and 4 relate to the question of establishing rents in order to ensure efficient factor allocation. And taken together they indicate that differential rents should be established as a cost on the basis of expected profits although modified to ensure that the allocation is in accordance with social costs and benefits rather than private costs and benefits. If it is difficult to calculate the social depletion allowance it is even more difficult to calculate the proper rent to be charged.

In theory one merely calculates the return to each of the other factors needed to ensure that they are applied to the exploitation of the resource, subtracts these rewards from the total income arising from exploitation and the surplus so defined is the economic rent. This is Marshall's knives and blades case where supply price is subtracted from demand to determine demand price. It is then merely necessary to work out the most efficient way of collecting that rent, remembering that methods of assessing the charge affects rates of exploitation and management. An alternative to this method is to use the price system and have the economic rent determined by competitive bidding by those who are interested in exploiting the resource.

In such developed countries as the United States, Canada, Australia and South Africa, the actual practice consists of a combination of these two methods although the extent to which one can use competitive bidding is partly dependent on the knowledge one has of the resource to be exploited. In the field of forestry for example, there is widespread use of stumpage appraisal by which governments attempt to value the stand of timber under normal management conditions and establish a minimum charge based on this appraised value. They then call for tenders from potential exploiters of the resource who bid on the basis of paying the minimum price established by the appraisal method. In Ontario, in Canada, for example, the bid was stated in terms of the number of dollars per cord of wood or per thousand foot board measure which the exploiter would be prepared to pay over and above the minimum or upset price established through appraisal methods. In some areas rights to extract petroleum are similarly auctioned off. For example, a company which obtains an exploration concession may be required, if it has been successful in finding oil, to turn back half or more of the original area to the government who then disposes of it at a public auction. The price established at this public auction is then applied to the production from those areas retained by the company which carried out the original exploration, with appropriate adjustments for exploration expenses.

More recent developments in the field of forestry have suggested that the stumpage appraisal method is at best a very poor approximation

to the economic rent, based as it is on the volume of standing timber which is itself the result of a lack of proper management and accidental fires and insect and disease epidemics. Stumpage appraisal was a reasonable approximation to the value of the standing timber and was therefore suitable for licences which required the company to return the land to the State when they had finished extracting the timber. But with more intensive management of forests and the long period between planting and harvesting, with the social costs of clear cutting and over cutting on water tables, soil erosion and so forth, there has been a movement in many countries towards more permanent types of tenure and differential charges based on productivity of the sites under "normal" management rather than on the value of the standing timber.

In the case of mineral resources, there is generally a lack of knowledge about mineral deposit and exploration would only be carried out if concessions, which usually ensure that the company which carries out the exploration will have the rights to exploit the minerals, are granted which determine charges before the resource is known. Thus it has not proved possible to apply bidding techniques to establish prices or rents. Indeed, most of the concessions in most parts of the world have made no attempt to extract the economic rent, and most governments have been forced to make bargains with people willing to explore. This has placed the onus for establishing rents on appraisal methods by the government. Unless governments are prepared to undertake much more exploration work themselves, and to carry this exploration work

through to the point at which they are able to give very complete information about the nature of the mineral deposit, it is unlikely that competitive bidding will become very useful as a method of establishing economic rents or prices for these resources.

In any event, no model can be used to establish a rational system of pricing resources which is too far out of line with the practices followed by other countries. In a very fundamental sense developing countries are competing with developed countries for the capital necessary to exploit resources, and as is pointed out in the literature cited in footnote 1 the sectoral capital output ratio in the extractive industries is very high; indeed resource industries are one of the heaviest demanders of capital, next to the transport sector, in terms of the output generated. Because Canada, Australia, South Africa, and the United States are still frontier areas in the sense of having an extensive margin to be cultivated and because owners of capital, mistakenly or otherwise, consider these areas to be safer fields for investment, developing countries have to establish pricing policies which will attract the capital required - which in turn means competing with the pricing policies of the owners of resources in these more affluent areas. It is unfortunately true that governments in all these areas still look to additional resource developments at the extensive margin to further their economic growth and development, and are all in the market, competing for funds in this area. Indeed the flow of finance into resource based industries in Canada and Australia in the past ten years has been greater

than the total flow of investment funds from the developed world to the developing world, and the situation is even more glaring if one excludes petroleum investments from the picture. Thus developing countries must attempt to establish pricing policies which are competitive with those granted in these affluent countries, which in turn generally means obtaining much lower returns from their resources.

This problem is clearly shown by the experience of Liberia in the concessions it has entered into in the field of iron ore. As is shown in the paper by Alan Batchelder and in the Report by the I.B.R. D. on Liberia, concession agreements in Liberia have generally restricted the total returns to the Liberian Government to about 50 percent of the net profits of the operations. This 50 percent is almost the total tax burden carried by these industries, and is in lieu of the normal corporation income tax, royalties etc. The low rate of return which Liberia is getting is illustrated by the extent to which this 50/50 rule falls short of what corporations in for example the United States pay on profits alone.

There are three aspects of concession agreements which determine the returns from the activity to the Government of Liberia. First, there is the actual rate of tax; second, there are the allowances and deductions allowed in arriving at net profit, including special problems of pricing the output; third, there are the additional non-financial provisions attached to the concessions.

With respect to the first of these one cannot accept that a 50/50 share of net profits is really satisfactory. There are very few places in the world where taxes on corporate income is much below 50 per cent so that it appears that the actual payment for resources in Liberia is negligible. This is not, however, an easy problem to deal with. In the first place many of these rates are established under agreements with the government and can only be changed by negotiation (unless concessions are unilaterally abrogated which is a very serious step). The extent to which tax laws in capital exporting countries do not allow royalties and other types of charges as an offset for liability for corporate taxes on corporations in the capital exporting countries seriously affects the ability of developing countries who are importers of capital from these countries to establish rational charges against resource based industries without making the total tax burden excessive. In this connection too, developing countries compete amongst themselves for scarce capital, and countries whose tax and royalty rates get too far out of line with those of other developing countries find it increasingly difficult to obtain an inflow of foreign funds. Establishing the maximum rate of taxes and royalties consistent with attracting the capital therefore necessitates detailed examination of tax and other laws in capital exporting countries and in competing capital importing countries - a type of detailed study which involves expertise in short supply all over the world. It is important to emphasise however, that such detailed studies should be carried out prior to entering into concession agreements.

In connection with the second determinant of the return which the government obtains from its resource industries, I do not need to say very much as Alan Batchelder's paper will cover the ground in some detail. However, in this connection I would stress the need for knowledgeable officials for both assessing the tax and determining the reasonableness of allowances and deductions. From seeing the results of governments dealing with large corporations in a number of countries I am firmly convinced that first-class accountants, lawyers and mining engineers more than earn their keep in ensuring that allowances and deductions are reasonable. But more than this, the concession agreements themselves must create conditions in which such expertise can be used. Particularly important in this respect are capital write-off allowances, prospecting and exploration expenses in non-contiguous area, management fees paid to affiliated and associated companies, policy with respect to the creation of reserves and the use of such reserves, the extent of depletion allowances and the extent to which the costs include excessive standards of amenities for the labour force both expatriate and indigenous. In this connection is extremely important that concessions agreements, or general over-riding legislation embody "arms-length" dealing clauses for both revenues and expenditures.

In connection with the third way in which governments may gain, one can stress such features in concession agreements as technical and vocational education for unskilled labourers who might in this way

replace expatriate technicians, fellowships and training programmes for professionals, rules about minimum rates of localisation of the total labour force, inbuilt provisions for utilising more labour intensive methods, stabilising rates of employment over time, and so forth. In this connection one must add a qualification. When I began this paper I referred to the general acceptance of the view that consistent fiscal policy can only be carried out if it encompasses all receipts to the government whatever their form, and all the expenditures of the government in carrying out its social objectives. There is a grave danger in special provisions, particularly those regarding education and training, that the government will find that it is losing control of essential resources flows which are being ear-marked for specific training and education within one sector. Sometimes this has to be done because of the unwillingness of organizations exploiting resources to enlarge their payments to the fiscus and their preference for specific types of education and training funds, frequently under their control, to deal with the manpower needs of their own sector. But one should realise that this is in conflict with the general canons of good fiscal policy as set out in the earlier papers that we have considered.

Let me now turn to a few ad hoc comments on the problem of returns from resource industries. These are rather haphazard, and I am not sure how they fit into any general theory except perhaps the application of the theory of games to the establishment of taxes and charges on resource-based industries.

Because the discovery of exploitable mineral deposits is so much a matter of chance and because, in spite of recent technological improvements in methods of exploration, it is still difficult to pinpoint with any accuracy areas for intensive exploration, there is a demand by groups who would conduct exploration for extensive areas in which they have sole rights to explore for specific types of minerals. In addition, in negotiating such rights groups frequently include sole rights to exploit any such mineral deposits discovered.

It is, of course, an extremely costly operation to conduct exploration over large areas and the risks of failure are very high. On the other hand, such exploration agreements tend to prevent the entry for shorter or longer periods of time of any other groups which might be interested in exploration. And, of course, the clauses relating to exploration leases must be made competitive with those of competing countries. What is important is to offer the most favourable terms from the government's point of view rather than the least favourable terms. In negotiation the groups will always point to cases where very favourable terms from their point of view were granted. As a bargaining counter it is important that the government be able to point to actual cases in which terms more favourable to the government were granted. In any event, it is important that the government retain as much flexibility as possible within the agreement and that it extract as much benefit as it can from giving up possible alternatives. Thus the government should tie up as little area as they possibly can in any exploration

lease, should attempt to ensure that significant portions of the area return to the government at an early date (this can be done by allowing the group concerned to nominate more restricted areas within the original area in which they will carry out more intensive exploration activities) and should require certain minimum expenditures on exploration during the life of the agreement and in each year of the agreement.

If total exploration expenses in the whole area are allowed as pre-production expenses on any commercially viable discovery then there is a case for the balance of the area covered by the exploration lease to revert to the government. Certainly a ground rent should be established for the areas still under lease, and there is something to be said for substantially increasing this rent for any extensive areas still held after a commercially viable discovery has been made. Particularly valuable area clauses which ensure that the government obtains all information (on a confidential basis if necessary) gained from exploration; and a clause which allows the government to seek some other exploiter (due consideration being given to exploration expenses) if a prospect is discovered which, in the view of the government, could be exploited.

There are two reasons for giving thought to provisions by which areas will revert to the government. In the first place it may be possible, given that a commercially viable discovery has been made in an area, to make much better bargains with anyone else interested

in exploring for minerals. In the second place, if the group which originally discovers an exploitable deposit is a price setter in international markets or is so large that it must take into account the effect of its output on market prices, then we know from our study of price takers and price setters in oligopolistic industries that small or marginal deposits which might be operated by a price taker are not likely to be operated by a price setter. This general conclusion also suggests that there should be control on the disposition of rights in an oligopolistic situation so that large price setting firms are prevented from taking over or buying out small price taking firms.

Many of the groups who are interested in exploring for minerals in underdeveloped countries operate internationally and depend upon large gains in some areas to compensate them for the losses from unsuccessful exploration activities in other areas. Very few prospects turn out to be successful mines and the international mining groups expect that their gains from successful operations will compensate them and their shareholders for the losses on unsuccessful efforts. From my discussions with senior officials in such groups, I am convinced that they consider this type of compensation essential to the raising of funds in speculative activities such as mining, and are unaware of the feeling of the individual countries concerned that their natural resources are being used to finance unsuccessful exploration activities in other countries. I know of no way to overcome this problem of the two sides to any agreement looking at the question of returns so differently, but this attitude on the part of the international groups suggests that

governments must be on their toes to protect their national interests.

The danger of the resources of one country being used to meet the costs of unsuccessful activities in other countries is particularly grave in the present situation in which only large international groups have the resources available to develop successful projects. Indeed, one of the basic criteria for granting exploration leases should be the ability of the group to which a lease is granted to finance a successful discovery. Certainly where this is not true the tax arrangement which is eventually agreed is not likely to favour the government as a "good deal" will be presented as a necessary condition for raising the vast amounts of funds necessary. Indeed, the ability of the government to bargain on such matters as gearing and further processing may be severely circumscribed if the group concerned does not have the finances available.

The dangers of giving rights to a group which has inadequate financial resources go much beyond the type of tax and royalty arrangements which the government can hope to obtain. A more fundamental problem relates to the extent to which such groups will raise funds through borrowing - and the drain which interest and debt repayment makes on the income from exploitation - and the conditions which are not infrequently tied to such loans. In order to have a guaranteed source of income to service such loans, or in order to obtain such loans directly from metal users, groups frequently have to negotiate "take or pay" contracts, or enter into long term sales agreements in

which the loans are repaid by shipments of metal to ultimate consumers. In both of these cases there is a grave danger of the price associated with the metal either for delivery against loans or under take or pay contracts, substantially reducing both the foreign exchange earnings from the activity and the profitability of the operation.

Certainly the people who guarantee such loans or provide the funds directly drive very hard bargains, and frequently set up a situation in which they will receive any economic rent arising from the project through high prices in the future.

The difficulties facing the government are even greater when the project appears to be marginal or near marginal. Under these circumstances the group exploiting the resources is unlikely to be able to raise the funds unless the tax and royalty burden is extremely low and in all likelihood fixed for a long period into the future. Under these circumstances the government has a very poor bargaining position in the short-run, and it will be the object of the group to tie the hands of the government in the long run so that, should the activity turn out to be highly profitable, the tax and royalty rates cannot be increased. These fixed tax burdens, and guarantees against new taxes, eliminate part of the usefulness of devaluation to correct "enclave" effects discussed above.

These are particularly thorny problems for a government as it will often be required to establish tax rates well below those in countries where the capital is raised, and the amount given up by the government who owns the resource is often gathered in at the other end

by the government of the country which supplies the funds. In this connection the international tax situation is far from helpful. Some countries, for example the United States, appear to allow a pooling of foreign tax credits of American corporations investing in certain areas of the world so that activities on which the tax burden is substantially above the burden in the United States provide credits which can be used against foreign income from other countries. This not infrequently means that the American Treasury does not gain from a lower tax rate as higher taxes paid in other countries can be used to offset tax liabilities in the United States. This situation creates a condition in which countries cannot use the American tax rate as the minimum rate they will charge on activities financed by American corporations. The willingness of tax authorities to allow "depletion" charges also affects the real tax rate.

One way to meet some of these difficulties is to establish a tax rate which is progressive with the profitability of an operation. (That is extracting the rent after the fact). Because progressive corporate taxes are such a novelty and such a dangerous precedent it has not been easy to get foreign groups to accept such innovations. At the present time for example, in one activity with which I am concerned, we are working on a proposal that the tax rate will vary with the profitability of the operation when the profitability gives rise to a certain level of return on the equity invested.

In this connection I would like to return to something I said earlier in the paper about the difficulty of establishing the normal return to the factors of production in order to calculate the surplus or economic rent. In this particular case it appears that the international group concerned - an American group - does not consider a rate of return of 48 percent per annum on the equity a reasonable level at which progressive tax rates should be applied, but is, in fact, asking that the profitability should increase substantially more before any progressive rate is applied. Most of us who think in terms of 10 or 15 percent rates of return after tax as reasonable will undoubtedly be horrified at the types of rates of return I am mentioning, but in actual negotiations in developing countries over tax and royalty rates such rates of return on equity are frequently demanded, partly because equity owners in mining companies hope to take advantage of the tax advantages in their own country for obtaining some of the return through capital gains from increased share prices rather than from dividends, partly because mining groups with insufficient funds at their disposal believe that such possibilities for gain are essential to successful fund raising.

One other feature of the demands which international groups make in tax and royalty negotiations is ability to get any capital invested in the operation out quickly. This normally takes the form of accelerated depreciation allowances for tax purposes, in its most extreme form, "as and when" privileges for capital write-offs. These

rapid write-off provisions are very hard to turn down as they have become more and more common in wealthy countries with resource frontiers. For example, the copper development at Palabora in South Africa was given "as and when" privileges which means that they can write-off capital expenditures as and when they occur, carrying forward any losses against subsequent income for tax purposes. Indeed, even in countries like Canada and the United States where company law normally precludes any dividend payments which would impair the capital of a company, mining groups have been allowed to pay dividends at the expense of depreciation reserves, dividends which far exceeded profits according to normal accounting conventions. When these sorts of practices are carried out by wealthy countries in the interests of new resource developments, it is extremely difficult for developing countries to follow different rules. Where these sorts of rapid write-off provisions are allowed it is clear that the mining groups may get any financial investment in the operation back in a matter of a few years, and must indeed raise serious questions about the equity of continuing to allow substantial rates of return on investments which have been in practice financed out of the profits of the operation.

In any agreement with a foreign group one of the objectives of the government must be to maximise the foreign exchange made available as a result of the activity to be undertaken. In a number of cases in the field of mineral exploration, although not as common

in this area as in industrial development, foreign groups have utilised domestic savings by borrowing from local banks to finance a large part of the investment. It is therefore important that agreements embody restrictions on the ability of foreign groups to borrow locally to meet their capital needs.