

Malcolm Gillis\*

## Evolution of Natural Resource Taxation in Developing Countries

### I. INTRODUCTION

This paper examines the long-term evolution of objectives and instruments of taxation of non-renewable natural resource endowments in a wide spectrum of developing countries other than Mid-East oil exporters. Resources in energy (oil, coal and uranium) and non-fuel minerals such as tin, nickel and copper, as well as tropical natural forest stands receive particular emphasis. Inclusion of tropical timber in a taxonomy of non-renewable resources is not usual, but is entirely justified. The long growing cycles (40-120 years) for most species of commercial logs harvested from the natural tropical forests of Asia, Africa and Latin America, the fragile ecology of the tropical forest, and the widespread lack of success in inducing regeneration of harvested species, have led forest specialists to classify the resource as either non-renewable, or semi-renewable at best.<sup>1</sup>

Two decades ago, articles dealing with natural resource taxation in less developed countries (LDCs) were, perforce, largely confined to discussions of the implications of only two forms of fiscal exactions, royalties and corporate income taxes.<sup>2</sup> These articles ordinarily considered the levying of such exactions within the context of traditional concession contracts upon one type of enterprise: private sector transnational corporations (TNCs) from developed countries, primarily the United States. The literature of that period explored a recurrent theme: the view that LDC host countries with attractive natural resource endowments were, owing to a lack of bargaining skills and technical know-how, at a marked disadvantage in dealing with transnational corporations. As a result, there was a general perception, certainly within LDCs, that the provisions of

---

\*Institute Fellow, Harvard Institute for International Development, and Lecturer in Economics, Department of Economics, Harvard University.

1. See, e.g. Gomez-Pompa, Guevara, and Yanes, *The Tropical Rain Forest, A Non-Renewable Resource*, 177 *SCIENCE* 762-765 (1972). See also: U.S. INTERAGENCY TASK FORCE ON TROPICAL FORESTS, *THE WORLD'S TROPICAL FORESTS* (1980).

2. See, e.g. Baklanoff, *Taxation of United States-Owned Copper Companies In Chile: Economic Myopia vs. Long-Run Self Interest*, 14 *NAT'L TAX J.* 81, 84 (1961) and Penrose, *Middle East Oil: The International Distribution of Profits and Income Taxes*, 27 *ECONOMICA* 203, 212 (1960).

many natural resource agreements, particularly those pertaining to taxes, were skewed in favor of foreign firms.<sup>3</sup>

By 1980, the patterns of host country taxes and natural resource investors bore little resemblance to those prevailing in 1960, or even to those of the late sixties. Fundamental changes have taken place in the mix of fiscal instruments employed by host countries for exacting a larger share of rents from their natural resource sectors.<sup>4</sup> Further, both host country capacities for effectively capturing natural resource rents and the nature of the enterprises engaged in extractive activity in LDCs have fundamentally changed. The pace of changes in taxation has not by any means been uniform across all types of natural resources. The changes have been most rapid in the case of oil, slowest in the case of uranium, gradual but steady in hard minerals, and non-existent in tropical timber until 1978-79, when tax measures adopted by major producing countries effected quantum, rather than evolutionary, changes. Within different categories of natural resources, however, there is some evidence of the operation, on an international scale, of something resembling a "tax demonstration effect." For example, innovations in taxation of oil in one group of countries appears to lead, with only short lags, to similar changes in oil and even coal taxes in other LDCs, but not in taxes on uranium, another energy resource. Change in one country's tax treatment on copper seems to be quickly recognized and applied elsewhere not only in copper taxes but in the taxation of other non-fuel minerals. In some cases, the "demonstration effect" appears to operate more strongly on a regional, but not worldwide scale, as in tropical timber. Major adjustments in Indonesian and Malaysian taxes on timber, for example, apparently have induced no changes at all in West African or Latin American timber taxes. The remainder of this section sketches the broad outlines of changes in taxation and identities of investors.

#### *A. Overview of Tax Instruments: Breakthroughs and Sneakthroughs*

In the early sixties, host country governments tended to rely heavily upon a mix of specific royalties and generally applicable income taxes

---

3. Prior to 1970, there were few published examples of systematic studies of natural resources taxes in particular developing countries much less across countries. Some of these are summarized in chapter 2 of R. VERNON, *SOVEREIGNTY AT BAY: THE MULTINATIONAL SPREAD OF U.S. ENTERPRISES* (1971). In general, the literature depicting the experiences of the fifties and early sixties by and large stresses a skewing of the benefits (including tax benefits) from LDC minerals projects against host countries, stressing the bargaining advantages of multinational enterprises over host developing countries. This perspective is particularly well expressed in D. SMITH & L. WELLS, *NEGOTIATING THIRD WORLD MINERAL AGREEMENTS 1-3* (1975).

4. An "economic rent" is generally defined as a scarcity return to a factor production in excess of what that factor would earn in its next best alternative use. Rent, whether in natural resource extraction or in any other activity, represents surplus value accruing to any factor of production in inelastic supply.

on natural resource operations. These governments set both taxes at low rates (sometimes zero rates where income taxes were concerned) relative to those now prevailing. The reliance on royalties and general income taxes has greatly diminished. In the past two decades, LDC governments have proliferated an array of new tax and tax-like instruments for rent appropriation.<sup>5</sup> Both breakthroughs and also what might be termed "sneakthroughs" have occurred. The widespread adoption of windfall profits taxes and windfall royalty systems in LDC natural resource sectors in the decade after 1970, well before similar devices were enacted in the United States, Norway and Britain, provides perhaps the most significant example of a real breakthrough. By 1980, many LDCs had enacted windfall profits, or excess profits taxes, on the extraction of all types of resources save tropical timber, including copper (Zambia in 1970,<sup>6</sup> Papua New Guinea in 1974<sup>7</sup>), other non-fuel minerals (Indonesia in 1977<sup>8</sup>), uranium (Colombia in 1977<sup>9</sup>), oil (Papua New Guinea in 1976<sup>10</sup>), and coal (Colombia in 1976<sup>11</sup>). In a closely related set of developments, windfall royalties, or adjustable royalties geared to resource prices, were adopted for Malaysian oil in 1976, Sabah tropical timber in 1979, and Peruvian oil in 1980. In all these cases, the investor pays a proportionally higher (as in oil in Malaysia and Peru) or progressively higher (as in Malaysian tin) additional royalty when prices exceed some base price established by the government.

The development of such tax-like methods for rent capture as "free equity" for host country governments in minerals projects presents another

---

5. A substantial amount of comparative information is presented in this paper. Much of the information is drawn from published and forthcoming articles by the author and collaborators, together with the sources which follow. Non-fuel minerals: M. GILLIS *et al.*, TAXATION AND MINING: NON-FUEL MINERALS IN BOLIVIA AND OTHER COUNTRIES, Ch. 5 (1978); M. GILLIS & R. BEALS, TAX AND INVESTMENT POLICY TOWARD HARD MINERALS, Ch. 7 (1980); L. WELLS & D. SMITH, NEGOTIATING THIRD WORLD MINERAL AGREEMENTS, Ch. 4 (1975); Energy resources: M. GILLIS & R. BEALS, TAX AND INVESTMENT POLICY TOWARD HARD MINERALS, Ch. 6 (1980); L. WELLS & D. SMITH, NEGOTIATING THIRD WORLD MINERAL AGREEMENTS (1975); M. GILLIS, ENERGY-4 CONTRACTS IN COLOMBIA, Appendices 2 and 5 (Report prepared for UNESCO, April 1980); and HOSSAIN, LAW AND POLICY IN PETROLEUM DEVELOPMENT (1981); Tropical timber: M. GILLIS, FISCAL AND FINANCIAL ISSUES IN TROPICAL HARDWOOD CONCESSIONS (to be published by United Nations Center for Transnational Enterprises in 1982); and M. GILLIS, FOREIGN INVESTMENT IN THE FOREST-BASED SECTORS OF THE ASIA-PACIFIC REGION (Report prepared for FAO, United Nations, 1981).

6. See M. GILLIS & R. BEALS, TAX AND INVESTMENT POLICY TOWARD HARD MINERALS 251 (1980).

7. See Mikesell, *Financial Considerations in Negotiating Mine Development Agreements*, 134 MINING MAGAZINE 261, 263-264 (1974).

8. See GILLIS & BEALS, *supra* note 6, at 156-157.

9. See M. GILLIS, ENERGY CONTRACTS IN COLOMBIA 40-46 (Report prepared for UNESCO, April 1981).

10. *Id.* Appendix 1.

11. *Id.* at 25-28.

example of the breakthroughs that occurred during the seventies. As explained in Section III, free equity represents one method of allowing differential returns for host countries on deposits of differential quality. Although this tool is not yet widely employed, demands for free equity have become increasingly more common in resource negotiations underway in the early eighties. Countries that have already utilized free equity as a tool for appropriating natural resource rents include Panama<sup>12</sup> (copper in 1976), Botswana<sup>13</sup> (copper-nickel in 1977) and Gabon<sup>14</sup> (uranium in 1979).

While these breakthroughs have attracted substantial attention to the extractive industry worldwide, numerous sneakhthroughs have gone little noticed. In the long run, these sneakhthroughs may have at least as significant an impact upon the division of resource rents between LDC governments and extractive enterprises as the breakthroughs. A steady shift, since 1960, away from specific (per unit) royalties and export taxes to *ad valorem* levies on resources won provides an example of such a sneakhthrough. Measures taken in Bolivia in the early seventies for hard minerals,<sup>15</sup> Colombia in oil in the early seventies,<sup>16</sup> Indonesia for hard minerals in 1970,<sup>17</sup> Jamaica for bauxite in 1974,<sup>18</sup> and Papua New Guinea and Indonesia for tropical timber in 1978-79<sup>19</sup> all exemplify this shift away from specific royalties and export taxes. The LDC governments' gradual abandonment of liberal tax incentives for investment in natural resource extraction represents another significant sneakhthrough. As proffered in the fifties and sixties,<sup>20</sup> such incentives included five to seven year income tax holidays, full import duty (and often export duty) exemption for the life of the mineral project, exemption from withholding taxes on repatriated profits, unlimited loss carryforward, percentage depletion allowances and very generous investment allowances carried over beyond tax-holiday periods. Such privileges were commonly available to

12. GILLIS & BEALS, *supra* note 6, at 169.

13. See S. LEWIS, THE IMPACT OF THE SHASHE PROJECT ON BOTSWANA'S ECONOMY 6-10 (1979).

14. United Nations Secretariat, Center for Natural Resources and Transport, 3 NAT. RES. AND ENERGY 1, 6 (1979).

15. M. GILLIS *et al.*, *supra* note 5, at 186-195.

16. GILLIS, *supra* note 9, at 4-5.

17. GILLIS & BEALS, *supra* note 6, at 47.

18. Gillis, McClure, *The Incidence of World Taxes on Natural Resources with Special Reference to Bauxite*, 65 J.M. ECON. REV. 389-393 (1975).

19. M. GILLIS, FISCAL AND FINANCIAL ISSUES IN TROPICAL HARDWOOD CONCESSIONS 55-61 (to be published by United Nations Center for Transnational Enterprises in 1982).

20. For a summary of the types of incentives offered to natural resource firms in this period, see Gillis, Bucovetsky, *The Design of Mineral Tax Policy*, and Gillis, Petersen, Wells, *Issues and Policies Related to Mining Tax Reform*, in M. GILLIS *et al.*, TAXATION AND MINING: NON-FUEL MINERALS IN BOLIVIA AND OTHER COUNTRIES (1978).

foreign investors in the fifties and sixties in Liberia<sup>21</sup> (iron ore), Philippines (all hard minerals), Indonesia (copper), and such Francophone African countries as Gabon, Niger and Chad.<sup>22</sup> By the early seventies, virtually all developing countries had abandoned percentage depletion. Income tax holidays for foreign investment in natural resources had begun to give way either to reduced rates or corporate tax in the early years of operation (Indonesia<sup>23</sup>) or to guarantees of stable tax rates for specified periods (Surinam, Ghana). By 1980, virtually no LDC governments outside of former French African colonies offered tax holidays of any kind to natural resource firms, domestic or foreign. A recognition that such devices served primarily to confer major windfalls on stockholders of natural resource firms, with little appreciable impact on enterprise investment decisions and very limited benefits for host countries had emerged among LDCs.

Perhaps the most significant of the sneakthroughs has been the steady growth in the capacities of many LDC governments for reducing the scope for transfer-pricing abuses between affiliates of transnational firms. These abuses entail two problems. Prices charged on affiliate transactions not only do not reflect "arms-length" prices, but are so arranged as to evade tax obligations to the host country. While not all TNCs have been major offenders, the potential for host country losses from transfer-pricing practices is considerable: in 1977 fully 95 percent of total exports by large parent TNCs in petroleum were dispatched to their own affiliates; in metals manufacturing, the proportion was 78 percent in TNCs with more than half their production outside the enterprises' home country.<sup>24</sup> Through the sixties and into the seventies, manipulations of transfer prices, on both inputs and outputs of natural resource TNCs, resulted in significant understatement of taxable income in a wide variety of LDCs.<sup>25</sup>

Countries responded to such abuses in a variety of ways. Indonesia and the Congo narrowed the scope for understatement of gross export income by adopting posted-price systems for export of tropical logs. Under these systems, both income and export taxes were assessed on the

---

21. See D. SMITH & L. WELLS, *NEGOTIATING THIRD WORLD MINERAL AGREEMENTS*, Ch. 3 (1975).

22. M. GILLIS, *et al.*, *supra* note 5, Ch. 3.

23. Gillis, Beals, *The Evolution of Indonesian Hard Mineral Agreements*, 4 NAT. RES. FORUM 341, 348-350 (1980).

24. J. STOPFORD, J. DUNNING, K. HABERICH, *THE WORLD DIRECTORY OF MULTINATIONAL ENTERPRISES*, XXIII, iii-xii (1980).

25. Measures to combat TNC transfer-price abuses (including transfer prices on capital) were taken in Liberian iron ore, Chilean copper, Indonesian and Congolese tropical timber, Gabonese uranium, and Libyan and Indonesian oil. On cases involving Liberian iron ore, Libyan and Indonesian oil, see D. SMITH, L. WELLS, *supra* note 21, at 74-81. On Indonesian and Congolese timber, see M. GILLIS, *FISCAL AND FINANCIAL ISSUES IN TROPICAL HARDWOOD CONCESSIONS*, *supra* note 19, at Ch. 5. On Gabonese uranium, see Jolly, *The Mineral Industry of Gabon*, MINERALS YEARBOOK 347-48 (1977).

basis of the government's, rather than the companies', reading of world market prices. In the mid-seventies, Bolivia and Colombia moved to forestall under-invoicing of uranium concentrate exports by adoption of methods gearing concentrate prices to readily observable international market quotations.<sup>26</sup> Jamaica, in 1974, tied its *ad valorem* bauxite royalty to the price of an internationally-traded downstream product (aluminum ingot), because vertical integration in the six TNCs that dominated bauxite mining meant that arms-length prices for the upstream product (bauxite) were not then readily available anywhere in the world. A no less significant LDC policy development in limiting transfer price abuses on capital transfers was a trend toward imposition of limits on deductibility of interest in the computation of net taxable income of foreign investors. Large TNCs, particularly Japanese-based firms, had long been accustomed to manipulating the capital structure of their LDC subsidiaries so as to overstate interest deductions, and thereby reduce host country taxes. These firms accomplished this aim by providing finance from affiliated firms, with a significant proportion of equity finance disguised as debt.<sup>27</sup> Indonesia took steps to curtail this practice as early as 1968. In that country's production-sharing contracts with foreign oil companies, *all* interest of any kind was disallowed as a deduction.<sup>28</sup> Measures taken elsewhere, including the Indonesian hard-minerals sector, did not go nearly so far, but merely disallowed deduction of interest paid to affiliates, or established maximum debt-equity ratios above which interest was non-deductible.<sup>29</sup>

Thus, a substantial broadening and maturation of the array of fiscal instruments that host countries may employ to capture rents from investments in natural resources has characterized the period since 1960. As noted in a subsequent section, marked changes in the distribution of resource revenues between host governments and investors have accompanied this trend. The new LDC fiscal regimes applicable to natural resource investors provide for much more effective taxation of large privately-owned TNCs than the regimes of twenty or even ten years ago.

#### *B. Evolving Patterns of Investment in LDC Natural Resource Sectors*

For the first decade and a half of the post-war period, American-based private sector TNCs heavily dominated investment in LDC natural resource sectors, not only in oil and hard minerals, but in the rich tropical forests of Insular Southeast Asia. The early domination of American firms

---

26. See GILLIS & BEALS, *supra* note 6, Ch. 6.

27. For a detailed examination of this form of transfer-pricing abuse, see GILLIS & BEALS, *supra* note 6, at 140-146.

28. SMITH & WELLS, *supra* note 21, at 77.

29. GILLIS & BEALS, *supra* note 6, at 139-144.

resulted from their very substantial advantages in securing massive amounts of capital and to the unique package of technological, management and marketing skills American firms had managed to assemble. The position of American-based firms in all international investment, including national resources, began to erode substantially after 1960. Owing to the much more rapid growth of investment by private European and Japanese-based TNCs,<sup>30</sup> the U.S. share in direct foreign investment abroad had fallen to 45.5% by 1978, while the share of Japan and West Germany (combined) rose from 4% to 16% between 1960–1978.<sup>31</sup> By the late sixties, privately-owned TNCs from developed countries, including the United States, Europe and Japan still accounted for an overwhelmingly large proportion of investment in natural resource projects in LDCs. By 1980, however, the emergence of three new types of other natural resource investors had undermined significantly the dominant position of privately-owned TNCs from developed countries. These included (a) state-owned TNCs from developed countries, (b) private-sector firms from other developing countries, and (c) state-owned enterprises of the LDC host countries themselves.

State-owned natural resource TNCs from *developed* countries now play major roles in natural resource extraction in LDCs, particularly in uranium, and to a lesser extent in oil. By 1980, no less than six large European-based state-owned enterprises were active in uranium exploration in LDCs, where their investment activities since 1973 have surpassed those of their private sector counterparts in the United States.<sup>32</sup> In oil, state-owned firms from France, Britain and Italy are among the 12 largest foreign investors in LDC petroleum extraction.

The activities of the other, newer type of investor in natural resources have been expanding no less rapidly in recent years. The phenomena of LDC-based firms investing in *other* LDCs has been particularly striking in tropical timber: investors from other developing Asian countries are responsible for well over half of foreign investment in tropical timber in the three Insular Southeast-Asian nations of Indonesia, Malaysia and Philippines. Together, these three countries account for nearly 80 percent of world exports of tropical hardwood logs. In Indonesia alone, the world's second largest producer in 1979, Philippine, Malaysian, and Hong Kong firms were each responsible for more investment than American or Japanese TNCs. LDC-based TNCs in general accounted for 68% of total

---

30. Gillis, *Multinational Corporations and A Liberal International Economic Order: Some Overlooked Considerations*, in Amacher, Habeler, Willet, eds., CHALLENGE TO A LIBERAL INTERNATIONAL ECONOMIC ORDER 199–209 (1979).

31. STOPFORD, DUNNING, HABERICH, *supra* note 24, at XV.

32. Erickson, Gillis, *High Level Enterprise and Low-Level Radioactivity: Two Hazards in LDC Uranium Concessions*, 6 J. OF ENERGY AND DEV. 44 (Autumn 1980).

foreign investment in the Indonesian timber sector.<sup>33</sup> The spread of LDC-based TNCs in natural resource investments extended beyond the timber industry. Brazilian firms, including state-owned firms, have actively explored for oil, coal, and uranium in Colombia and other Latin American countries, and several Mexican firms reportedly have begun to seek opportunities in hard-minerals mining in Central and South America.

Perhaps the most significant growth in natural resource investment in LDCs since 1970 has resulted from the activities of state-owned enterprises (SOEs) from the host countries themselves. Some of the enterprises, including Petrobras and CVRD of Brazil, Gecamines of Zaire, Codelco of Chile, Centromin of Peru, PEMEX of Mexico, PERTAMINA of Indonesia and several others are among the 500 largest enterprises outside the United States. State-owned firms play a particularly important role in hard minerals mining sectors in many countries. Host country SOEs account for 60% of hard mineral output in Indonesia, nearly 100% in Zaire and Zambia, 80% of Brazilian iron ore exports, nearly two-thirds of Bolivian mineral production, and one third of Korean mineral production. For Latin America as a whole, SOEs acting alone or in joint venture arrangements with foreign firms will implement fully 70 percent of planned investment in hard-minerals mining over the period 1979–85.<sup>34</sup>

The evolution of the international oil industry since 1957 exemplifies well the erosion of the once commanding position of *developed* country TNCs in natural resource extraction in developing countries. In 1957, nearly 90% of crude oil traded in world markets flowed through the legendary “seven sisters” (seven major TNCs from developed countries). By 1970, the share controlled by the seven had slipped slightly to 78%, but by 1979, this share had fallen dramatically, to just under 24%. By that year, fully 69% of crude oil traded on world markets was marketed by state-owned oil companies from the producing countries themselves.<sup>35</sup>

Throughout the postwar period, both the design and implementation of LDC tax policy in the natural resources area have been strongly influenced by host country desires to wrest larger shares of resource rents from very large, private sector TNCs from the industrial countries. By the seventies, many countries had begun to master the technology required for effective taxation of such enterprises. But the growing importance of newer types of investors in LDC natural resource endowments has created

---

33. M. GILLIS, FOREIGN INVESTMENT IN FOREST-BASED SECTORS OF THE ASIA-PACIFIC REGION, Ch. 2 (Report prepared for FAO, United Nations, 1981).

34. Gillis, *The Role of State Enterprises in Economic Development*, 47 SOC. RESEARCH 251–256 (Summer 1980).

35. Levy, *World Oil Marketing in Transition*, Harvard University, Center for International Affairs, Working Paper 8–10 (May 1981).



several novel tax issues for policy-makers there. These include problems of taxation of smaller and perhaps more foot-loose TNCs from other LDCs, the politically sensitive issue of taxation of state-owned TNCs from Europe as well as other LDCs, and the difficulties involved in capturing, through taxes and related devices, resource rents from host country SOEs in natural resources. LDC systems of natural resource taxes, developed primarily with an earlier type of investor in mind, may or may not prove well suited to the evolving pattern of investment in LDC natural resource sectors. Experience thus far furnishes little basis for judgements on this issue.

## II. EVOLUTION OF OBJECTIVES

Revenue considerations have traditionally had the most significant influence in molding LDC objectives in tax policy toward natural resource endowments, although we shall see below that perspectives on revenue objectives have altered substantially over the post-war era. But virtually no LDC has sought revenue goals to the exclusion of other aims that might be secured through natural resource taxation. Even in the fifties, many countries were also employing resource tax policy to promote domestic processing of natural resources, and by the seventies several nations had begun to view tax policy as one means of controlling social costs involved in resource extraction. This section traces the evolution of these objectives, as exemplified by the experiences of several representative countries.

### A. Taxes and Rent Capture

Stress upon revenue objectives of LDC natural resource tax policy remains as strong in the 1980s as in the late fifties. Perspectives on strategies for securing revenue objectives, however, have altered considerably over that period. Not two decades past, these revenue goals tended to be expressed in relatively modest terms. This was primarily because, as noted earlier, LDC officials viewed their bargaining position as decidedly weaker than those of the TNCs. There was thus a tendency to accept contract arrangements that secured for the host country at least some share of resource rents from exploitation of natural resources by the large TNCs that then dominated resource extraction activity in LDCs. To a greater extent than now, host country capture of benefits from natural resource investment was largely dependent on tax policy,<sup>36</sup> rather than other policy instruments available to LDC governments. Indeed, non-tax benefits sought by host countries, such as employment, regional development and transfer

---

36. See R. MIKESSELL, *FOREIGN INVESTMENT IN COPPER MINING*, XXI (1975) and GILLIS & BEALS, *supra* note 6, Ch. 1.

of technology tended to be relatively insignificant in most LDCs, owing primarily to the marked capital intensity and import intensity of modern extractive operations.

As LDCs gained both experience in dealing with large TNCs and the capacity to operate more complex levies, revenue objectives began to be stated in much more ambitious terms. In some countries, these objectives were reflected in aggressive efforts to minimize TNC returns. These measures were often successful in the sense of short-run revenue maximization, but disappointing in development of minerals sectors in countries adopting such policies. In other host countries, emphasis shifted to the much sounder objective of optimizing net host country returns from natural resource investments, not by any means the same thing as minimizing TNC profits, given the nature of market and geological risks characteristic of natural resource exploration. By the eighties, a trend toward emphasis on improving net host country returns, rather than minimization of TNC returns, was observable across a wide variety of countries.

For the 1980s, the rapidly growing role of state-owned host country mineral enterprises may necessitate still another shift in emphasis toward insuring that resource exploitation by state-owned enterprises yields at least some tangible returns to the stockholder, i.e., the host government. Experience thus far, from countries as diverse as Bolivia, Indonesia, Zambia, Zaire, Turkey and Brazil does not strongly suggest that state-owned minerals enterprises will always act as responsible taxpayers, much less act in the public interest at large.<sup>37</sup>

Even by the mid-seventies, the changes in tax policy and tax administration sketched earlier had converted the natural resource sectors in a number of LDCs into very significant revenue producers. Natural resources furnished between 5 and 15% of total central government receipts in Thailand, Colombia, Honduras, Panama, Peru and the Philippines, between 15% and 25% in Chile and Malaysia, in excess of 25% in Ecuador, Mexico, Jamaica, Liberia, Zaire, and Zambia, and in excess of 50% in Bolivia, Indonesia, Gabon, the Malaysian state of Sabah, Papua New Guinea and New Caledonia.<sup>38</sup>

Recent measures for facilitating host country capture of resource rents, described in the first section, have met with a considerable degree of

---

37. One of the classic cases of conduct by a state-owned natural resource enterprises inconsistent with other government objectives was the Indonesian state oil company Pertamina in the period 1971-76. The enterprise accumulated over \$10 billion in debt, on such dubious projects as insurance companies, resorts, oil tankers and a steel mill. S. LIPSKY, *THE BILLION DOLLAR BUBBLE* 1-30 (1978). For other examples in other countries, see Gillis, *The Role of State Enterprises in Economic Development* 47 *SOC. RESEARCH* 251, 256 (1980).

38. GILLIS *et al.*, *supra* note 5, at 3; GILLIS, *FISCAL AND FINANCIAL ISSUES IN TROPICAL HARDWOOD CONCESSIONS*, *supra* note 19, at 77.

success, at least in terms of short-run revenue results. Except for uranium in general,<sup>39</sup> and in such countries as Chile, where income tax rates on new copper investments were reduced in 1980 to just under 50%, the percentage share of host country taxes in the value of resource production or in resource profits are now typically half again—and sometimes twice—levels common less than 25 years ago. This general increase indicates a very marked tightening of terms available to investors. The oil industry in particular has evidenced rising host country shares, even outside the Mid-East OPEC producers. Host country shares in oil revenue have exceeded earlier expectations of even the more knowledgeable of international observers of foreign investment. In 1970, Vernon, a perceptive analyst then and now, cautiously projected that host countries' shares of profits in oil, never much more than 10–15 percent before 1950, seemed "headed for a level in excess of 80% as a result of further concessions squeezed out of the oil companies."<sup>40</sup> By 1980, however, host countries' shares of profits in crude oil extraction had in numerous instances long since surpassed 80%. Indeed, by 1980, governments in such relatively small producing countries as Malaysia had managed to capture 80% of the value of oil production, and the government's share in total profits was 98.5%.<sup>41</sup> Even in countries such as Colombia that do not employ windfall profits taxes or windfall royalties on oil, the government's share in the value of oil produced approached 70% by 1980, while for many other non-OPEC producers as well as OPEC member Indonesia, host countries' shares of between 75 and 85 percent of value were common.<sup>42</sup>

Changes in taxation of tropical timber were bunched in the latter part of the seventies, after decades in which host governments seemed to overlook the sector as a source of tax revenue. Tax adjustments by Indonesia and the Malaysian state of Sabah (the two dominant producers) in 1978–80 resulted in very sizeable increments in revenues. In both jurisdictions, the share of taxes in gross value of timber exports doubled, from 14 percent to 29 percent in Indonesia, and from 26 percent to 53 percent in Sabah.<sup>43</sup>

The concept of retained value provides an alternative indicator of host country shares of benefits from natural resource projects. Several studies focusing on the division of benefits from foreign investment in hard minerals extraction use the concept of retained value.<sup>44</sup> While the measure

---

39. Erickson, Gillis, *supra* note 32, at 40, 44.

40. VERNON, *supra* note 3, at 54.

41. GILLIS, *supra* note 9, Ch. 2.

42. *Id.*, at 9–20.

43. *Id.*, at 50–60.

44. See R. MIKESELL, *supra* note 36, Ch. 4; M. GILLIS *et al.*, *supra* note 5; and GILLIS & BEALS, *supra* note 6, Ch. 1.

by no means represents a perfect method of assessing host country benefits from such activity, movements in the ratio of retained value to gross national resource exports are indicative of host country performance in capturing larger shares of resource rent over time. Simply put, retained value is defined as the total of all revenues from natural resource projects retained in the host country, as for example in (1) below:

$$(1) \quad RV = W_d + C_d + DP(1-Z) + K_d + T_d + Q_d$$

where:

RV = retained value

$W_d$  = labor income for host country workers employed in natural resource projects

$C_d$  = proportion of income of expatriate workers spent locally

DP = domestic procurement of goods and services for natural resource projects

Z = import content of DP

$K_d$  = capital income for domestic shareholders (including governments) in natural resource projects

$Q_d$  = miscellaneous payments received in host country

Retained value is itself a fraction of total proceeds (R) from natural resource projects, where R is broken up into components as given in (2):

$$(2) \quad R = M + I + L + P + W_f + U + RV$$

where:

M = cost of imports

I = interest cost on external loans and credits

L = loan repayments

P = profits remitted abroad

$W_f$  = salaries of expatriates accruing abroad

U = unidentified items

RV = retained value as defined in (1) above

The proportion RV/R, prior to the mid-sixties, was typically less than 50% in many LDCs with significant foreign investment in natural resources. For example, for Peruvian copper mining in 1960-65, retained value represented only 30% of gross export proceeds in large projects operated by foreign enterprises.<sup>45</sup> In Sierra Leone, retained value in the foreign-owned mining sector in 1963-65 equalled only 43% of R, and in Bolivian hard minerals in 1973-74 about 56% of gross mining revenues.<sup>46</sup> In the Indonesian timber sector, retained value in the early sev-

45. MIKESELL, *supra* note 36, Ch. 4.

46. GILLIS & BEALS, *supra* note 6, Ch. 1.

entities rarely exceeded 20% of reported gross timber export earnings.<sup>47</sup> In all instances cited above, save Bolivia, foreign firms received one or more forms of special tax incentives, usually in the form of income tax holidays of five years or more.

The capital- and import-intensity of modern mining generally has meant that the non-tax components of retained value were relatively small, and that efforts to secure significant increases in retained value had, by necessity, to be focused on tax adjustments. Peru managed to increase substantially the ratio of retained value to total copper exports from 30% in 1960-65 to 50% in 1966-72, principally through higher taxes resulting from renegotiation of its agreements with foreign firms. Indeed, in the latter period, taxes accounted for just over 60% of retained value in the largest Peruvian copper project.<sup>48</sup> In both Bolivia and Sierra Leone, taxes accounted for over 45% of retained value, and in West African tropical forestry in the early seventies, taxes accounted for as much as 75% of retained value in TNC forest projects.<sup>49</sup> In Indonesian tropical timber projects mounted by foreign enterprises in the late 1970s, very substantial increases in export taxes and other fiscal levies resulted in a very sharp increase in retained value, from less than 25 percent of gross export earnings in 1975 to perhaps 50 percent by 1980.<sup>50</sup>

Although host country governments have achieved some success in increasing their share of rents in natural resource projects involving large privately-owned TNCs, the record with respect to their own state-owned enterprises reflects rather mixed results. As a subsequent section indicates, many host governments do not subject their state-owned natural resource enterprises to all, or sometimes any, of the taxes and fiscal levies imposed on foreign firms. Many governments that do attempt to tax their own SOEs have often failed to administer the taxes effectively. Reluctance of governments to apply the full range of fiscal instruments, developed to tax foreign enterprise, to their own natural resource enterprises seems incongruous. From the work of many analysts it is clear, certainly in the case of foreign investment in extractive industries, that the major benefits that host countries derive from such investment arise from government tax revenues, and some maintain that the same observation may be no less applicable to investments by host country state enterprises.<sup>51</sup>

One reason for the apparent reluctance of governments to tax their own

47. M. GILLIS, FOREIGN INVESTMENT IN THE FOREST BASED SECTOR OF THE ASIA PACIFIC REGION 81-90 (1981).

48. MIKESELL, *supra* note 36, Ch. 4.

49. GILLIS & BEALS, *supra* note 6, Ch. 1.

50. GILLIS, *supra* note 47, at 109-110.

51. MIKESELL, *supra* note 36, at XXI has been the leading advocate of the first view. Gillis, in GILLIS *et al.*, *supra* note 5, at 17-19 and in GILLIS & BEALS, *supra* note 6, Ch. 3 is associated with both the latter view as well as that voiced by Mikesell.

enterprise progeny may stem from the view that taxation of state-owned firms represents nothing more than a "wash transaction": taxes on one aspect of governmental operations (SOEs) are seen as mere reallocations out of a common pool of resources available to the government. Proponents of this view contend that a government should be indifferent between profits accumulating in natural resource SOEs or profits that flow to the treasury in the form of taxes and dividends collected from the SOEs. Elsewhere<sup>52</sup> the author and collaborators have argued that this view is fundamentally unsound; that taxes on SOEs, particularly SOEs in natural resources, involve far more than mere "wash transactions." Indeed, failure to adequately tax such enterprises may not only result in the squandering by SOEs of large amounts of natural resource rents<sup>53</sup> but may adversely affect the management of SOEs through its effects on risk-taking, factor choice and enterprise growth strategy.<sup>54</sup> Fortunately, several LDC governments have come to the same conclusion in recent years, as shown below.

### B. Taxes, Risk and Investment

As noted earlier, maximization of host country returns from natural resource endowments does not necessarily imply minimization of returns for mineral investors. In particular, governments that have restructured resource taxes to yield the maximum tax revenue from existing projects have often discovered that in doing so they may have precluded possibilities for new investments and consequently foregone sizeable tax revenues in the future.<sup>55</sup> Resource tax systems designed with due attention to the risks perceived by risk-averse decision-makers in large mining firms can, however, serve to increase significantly host country returns at high levels of investment in exploration and development by minerals enterprises. Specifically, tax systems that discourage development of marginal deposits comport neither with tax revenue maximization for governments nor with high levels of investment by extractive enterprises.

This point can be best understood by focusing upon two unintended results of tax systems that involve the same fiscal treatment for all deposits of a given resource. First, because profitability is, *ceteris parabus*, positively associated with size of reserves, such a system discriminates against

---

52. Gillis, Lessard, Jenkins, *Public Enterprise Finance: Toward A Synthesis* in L. JONES, R. MALLON & R. VERNON, *PUBLIC ENTERPRISES IN DEVELOPING COUNTRIES* (to be published 1982).

53. Dissipation of resource rents by LDC SOEs was particularly marked in Indonesia oil from 1971-76. (See LIPSKY, *supra* note 37, at 6-15) and in Bolivia before 1972 (See GILLIS *et al.*, *supra* note 5, at 57-59).

54. GILLIS, LESSARD, JENKINS, *supra* note 52, at 453.

55. See Palmer, *Mineral Taxation in Developing Countries: An Application of Resource Rent Tax*, 27 INT'L MONETARY FUND STAFF PAPERS, 517-530 (Sept. 1980).

the development of smaller, marginal deposits. Marginal deposits, while contributing little to investors' expected values, help reduce the variance in the firms' rate of return—and reduce the risk premia they demand—by distributing exploration costs over a higher probability of successful outcomes.<sup>56</sup> Application of this type of fiscal regime increases the variance in the firms' rate of return, both by overtaxing small deposits and undertaxing large deposits.<sup>57</sup> This increased variance serves to increase the operator's perceived risk and therefore his discount rate, thereby dampening exploration incentives. Potential surpluses available for taxation are thereby diminished. In the end, both exploration investment and tax revenues fall below levels possible under alternative systems of taxation, yielding the worst of both worlds. Tax regimes which hinder the development of marginal deposits pose a particularly serious issue for resources in which exploration costs constitute a major share of total extraction costs, as in oil and gas. The effects of uniform taxation of all deposits are less serious in the cases of coal and tropical timber, where exploration costs—and therefore risks—have historically been a much smaller proportion of total costs.

In the late sixties and early seventies, most LDC petroleum tax structures applied uniformly across fields of all sizes. By 1980, many systems had incorporated some form of differential taxation of fields of different sizes, usually through use of higher taxes (or production shares) on successively higher levels of production. This adaptation resulted partly from the recognition of the importance of minimizing contractor risk and partly as a by-product of the implementation of taxes designed to collect resource windfalls.

### C. Taxes and Social Costs in Resource Extraction

Host governments in less developed countries have only recently begun to consider systematically the social costs, or negative externalities, involved in any type of extractive activity. These costs include potential damages to water tables, degradation of air quality, hazards to health and safety involved in tailings disposal, and especially in tropical timber, the effects of extraction on erosion, silting of waterways and on microclimatic risks. Thus far, LDCs have used tax tools only sparingly in efforts to control social costs associated with extraction. Indeed, the mining and forestry codes of most LDCs are either largely silent on such issues or, where provisions exist concerning requirements for reducing the scope

56. This well known proposition is demonstrated in some detail in Stauffer, Gault, *Effects of Petroleum Tax Design On Exploration and Development*, AM. INST. OF MINING, METALLURGICAL, AND PETROLEUM ENGINEERS (1981).

57. *Id.*, at 6.

for such damages, penalties for non-compliance are rarely specified, and even more rarely enforced.<sup>58</sup>

The hazards appear greatest in uranium extraction and in the harvest of tropical timber, but only in the timber industry have host countries implemented fiscal measures for dealing with the problem. Uranium extraction involves significant environmental and health risks in the form of long-term hazards from release of low-level radioactivity, primarily from improper disposal of tailings from uranium mines and mills.<sup>59</sup> Not only have host governments failed to impose higher taxes on uranium and other radioactive substances to control and compensate for these costs, but uranium agreements concluded over the period 1970-78 generally involved fiscal provisions that, if anything, were less favorable to host countries than those prevailing in base mineral agreements involving less significant risks of substantial social costs.<sup>60</sup>

The situation is rather different in tropical timber, particularly among the major producers in Southeast Asia. Recognition of environmental risks associated with both selective *and* intensive cutting in natural tropical hardwood forests, together with increasing emphasis on preservation of the natural forest as an income producing asset, has led several Southeast Asian nations and Brazil to enact a number of taxes, charges, deposits, and incentives to promote reforestation and to finance land reclamation and dredging activities in areas affected by erosion and silting.

A variety of tax measures similarly reflect growing concern for the proper use and regeneration of timber resources. Brazil has employed for years a system of liberal tax incentives for reforestation, involving tax credits for qualified reforestation efforts.<sup>61</sup> Indonesia has adopted two such fiscal devices since 1970. The first involved a special "additional" timber royalty created in 1971, earmarked for financing the dredging of silted rivers and for resettlement of persons affected by timber harvesting projects. The second device, implemented in 1980, involves payment of sizeable deposits per unit extracted (about 4% of export value). The deposit is refundable only upon presentation of convincing evidence that a serious program of reforestation is underway and is adequately financed.<sup>62</sup> The government of Peninsular Malaysia also employs a refundable deposit, substantially lower than the Indonesian levy, and a system of earmarked charges amounting to about 3% of timber export value to finance reforestation programs. The Malaysian state of Sabah

---

58. GILLIS & BEALS, *supra* note 6, at 203-207.

59. Erickson, Gillis, *supra* note 39, at 3.

60. *United Nations Secretariat*, *supra* note 14, at 4.

61. Staff of Extensio Rural, *Tax Incentives for Reforestation*, 14 DEVELOPMENT DIGEST 19-23 (1976).

62. GILLIS, *supra* note 47, at 118-121.

16



and the Philippine government also employ timber taxes earmarked for reforestation purposes, but with rates set well below those of Indonesia and Malaysia.<sup>63</sup>

#### *D. Taxes and Domestic Processing*

Host LDC governments have long used tax devices to encourage domestic processing of their natural resource endowments. As early as the fifties, some East African countries employed much lower export tax rates on sawn timber than on log exports. The objective of such measures is of course to increase local value-added in the form of higher factor payments to domestic labor and capital. For much of the period 1950-75, the view that more domestic processing of resources was always economically advisable from the point of view of the host country prevailed widely both within LDCs and in the developed world. Development strategies based on this view led to construction of a number of processing projects that were either palpably uneconomic, or heavily skewed toward interests of the foreign partner rather than the host country government.<sup>64</sup>

Host governments may still, for political or other non-economic reasons, place strong emphasis on local processing of natural resource exports. By now, however, few examples exist outside of the tropical timber industry of the use of special tax instruments as a means of encouraging domestic resource-based industries. Whether because of the gradual spread worldwide of modern techniques of project evaluation, bitter experience from past crash programs to promote local processing, or generally growing sophistication in economic analysis in host countries, governments now seem less inclined to plunge headlong into this activity before minimal local requirements for skills and complementary inputs have been met. Thus, Indonesia in the mid-seventies briefly considered and then abandoned the implementation of measures that would have yielded substantially lower export taxes on downstream products than for bauxite, and lower taxes on exports of tin, copper and nickel ingot than on their concentrates. The decision to forego the measures resulted from a demonstration showing that the system would impose rates of effective protection on domestic minerals processing approaching 650 percent, a level of protection that speaks for itself.<sup>65</sup>

In tropical timber, however, the major producing countries began in 1978 to make more vigorous use of tax instruments, in conjunction with log export quotas, to promote local processing. These measures have

---

63. GILLIS, *supra* note 19, at 99-107.

64. Palpably uneconomic processing projects included Bolivia's tin smelter, Colombia's petrochemical investments between 1965 and 1974, and Indonesia's steel mill.

65. Effective protection measures the protection afforded by government policies to value-added in domestic processing. M. GILLIS & R. BEALS, *supra* note 6, at 22-24.

been adopted even as large plywood mills and other wood-processing firms in Japan, Korea and elsewhere have closed because of insufficient log supplies and obsolete processing facilities. The Malaysian state of Sabah imposes a royalty on sawn timber and plywood that, depending on the case, is  $\frac{1}{4}$  or  $\frac{1}{8}$  the amount of Sabah's royalty on logs. Papua New Guinea imposes a 10% export tax on logs, but imposes no export taxes on processed wood products. Finally, Indonesia imposes a 20% export tax on logs, but only a 5% tax on sawn timber, and collects no export taxes on plywood. In Indonesia, the differentiation of the timber export tax structure results in rates of effective protection (protection to domestic value added) of between 40 and 50 percent for sawmilling and between 45 and 60 percent for other wood processing industries.<sup>66</sup> With rates of effective protection of this magnitude, the Indonesian wood processing industry could operate at half the efficiency of foreign sawmillers and plywood manufacturers and still remain competitive in the international market. Alternatively, the measures allow profitability of wood processing to be as much as 50% higher in Indonesia than elsewhere, and as much as 75% to 100% higher in Sabah than in Korea and Japan.<sup>67</sup> The incentives furnished by such manipulations of resource taxes are therefore very substantial, as are the potential costs of inefficient investment.

### III. EVOLUTION OF INSTRUMENTS

#### A. *The Emergence of Windfall Taxes in LDCs: Implications for Rent Capture and Risk*

Windfall taxes on natural resources, whether in the form of windfall income taxes or windfall royalties (or excises, as in the United States) belong in the family of "excess profits taxes" used widely since the turn of the century in wartime, both in developed and developing nations.<sup>68</sup> Although generally applicable excess profits taxes have proven administratively unworkable in virtually every instance in which they have been imposed,<sup>69</sup> a wide constituency of both academic authorities and LDC decision-makers has come to view excess profits taxes confined to the natural resource sector as useful tools for capturing economic rents from exploitation of natural resources. The capital intensity of modern natural resource extraction allows the application of the excess profits or windfall taxes to a relatively small number of firms oriented to the export market.

66. GILLIS, *supra* note 47, at 86-88.

67. GILLIS, *supra* note 47, at 89-90.

68. Gillis, McLure, *Excess Profits Taxation: Post-Mortem On the Mexican Experience*, 32 NAT'L TAX J. 501, 502 (1979).

69. *Id.*, at 503.

Tax authorities have greater access to the tax base in the export market than to the tax base for non-traded goods because exports must pass through easily monitored bottlenecks called ports. Thus, the windfall resource taxes are at least in principle administerable at less than exorbitant costs to both government and investor. Inasmuch as host governments have historically derived little more than tax revenues from the extraction of their resources, the taxes are therefore viewed as essential for "automatically" assuring acceptable host country shares of the benefits of such activity. Flat-rate taxes on corporate income and/or royalty rates that are invariant with respect to minerals prices cannot perform this function. If the flat-rate taxes are set high enough to yield sizeable tax revenues on existing resource projects when world resource markets are strong, they will tend to choke off new investment. If they are set low enough to induce new investments, the host country will reap minimal returns when unforeseen developments, as in world oil and uranium markets in 1973 and 1978, send resource prices soaring or when deposits of exceptional size and/or quality are discovered. Host countries have therefore sought devices that would enable them to capture a substantial share of rents that arise both from unforeseen developments in world prices and from discoveries of particularly large or rich deposits, without having to resort to the type of disruptive renegotiation or unilateral changes in taxes that was not uncommon in the sixties and seventies.<sup>70</sup> Such devices would be unnecessary only under conditions in which governments and investors have perfect knowledge concerning the future course of world resource prices and where the location, extent and quality of all future commercial deposits are known with certainty. Neither condition obtains in reality.

Host countries have employed a wide variety of "automatic" instruments for rent capture. Some, as we shall note, are fairly well suited for appropriating windfalls from unforeseen developments in world resource prices (*market* windfalls) but not those arising from discovery of unexpectedly rich deposits. Others have been primarily designed to capture rents from higher quality deposits (*discovery* windfalls) but tend to be ineffective in generating additional tax revenues when prices increase dramatically. Finally, a few of the devices are geared for capture windfalls

---

70. Demands by governments for renegotiation of natural resource contract terms and/or unilateral changes in tax laws often, but clearly not always, lead to acrimonious conflicts between investors and host governments in the sixties and seventies. In Indonesia, foreign oil contractors virtually ceased exploration activities in 1977-78, following that country's alteration of basic contract terms in 1976. Exploration investment returned to pre-1976 levels only in 1979. M. GILLIS & R. BEALS, *supra* note 6, at 179. In Jamaica, several foreign TNCs in bauxite mining sharply reduced investment in the industry following the government's 1974 decision to increase bauxite taxes by over 600%. Gillis, McLure, *The Distributional Implications of The Taxation of Natural Resources*, 61 RICE U. STUD. 143, 161 (1975).

arising from both sources. These devices are more difficult to administer effectively. Some LDCs use a combination of methods to secure objectives of windfall taxation. Among countries producing more than 100,000 bbls of oil per day, Colombia appears to be the only nation that has refrained from using any kind of windfall tax on oil, even though both coal and uranium are subject to such taxes in that country. Not all methods have proven to be fully effective, but their presence may at least be expected to reduce the incidence of the type of acrimonious disputes over renegotiation of tax obligations so common in natural resource investment in the late sixties and early seventies. Examples of such disputes include Jamaica in bauxite in 1974, Papua New Guinea in copper in 1973 and Indonesia in oil as late as 1976.

### *1. Instruments for Capture of Market Windfalls*

Measures designed to capture market windfalls (excess "price" taxes) have been adopted in recent years in a number of jurisdictions, including Malaysia (oil and tin), Indonesia (coal), Peru (oil) and Sabah (timber). This type of device affords one of the simplest forms of windfall tax, and in the first instance involves the establishment of an indexed "basic" oil (coal, tin, copper, etc.) price for a base year. The host nation then imposes special tax rates over and above those ordinarily applicable upon any excess of actual f.o.b. prices over the indexed basic price. The Malaysian and Peruvian windfall taxes on oil furnish instructive contrasts in the use of these devices. The Malaysian windfall tax, in operation since 1977, results in windfall taxes of \$13 per barrel at early 1981 prices of \$34 per barrel.<sup>71</sup> The Peruvian tax yields zero "windfall" revenues at the same per barrel price. The Sabah progressive timber royalty imposes a form of windfall tax on *presumptive* income per unit harvested. At very low f.o.b. log prices, the royalty amounts to 30 percent of log value; at very high log prices, the royalty approaches 57 percent of export value, while at 1981 log prices, the royalty is about 40% of export value.<sup>72</sup>

### *2. Discovery Windfalls and Risk Minimization*

Taxes on discovery windfalls have been utilized primarily in oil, occasionally in uranium and coal, and rarely in hard minerals and tropical timber. In oil, profitability ordinarily rises with the size of the reserves. The minimization of contractor risk as well as attainment of equity in the revenue split between government and investor means that the government's share should rise with the size of reserves in any given field. Field

---

71. GILLIS, *supra* note 9, at 11-12.

72. M. GILLIS, *FISCAL AND FINANCIAL ISSUES IN TROPICAL HARDWOOD CONCESSIONS*, *supra* note 19, at 56-58.

size, however, is unknowable at the outset of exploration. Even after discovery, accurate determination of the amount of reserves contained in a given petroleum deposit is problematical, even more so than in the case of coal or uranium. Thus, policy-makers in the LDCs have found the use of output (daily averages or annual averages) as a surrogate for reserves to be expedient, notwithstanding problems involved in resorting to this expediency. Oil contracts in such non-OPEC nations as Liberia, India, Sri Lanka and Bangladesh all provide that contractor payments (or oil deliveries) to governments increase with production from a particular field.<sup>73</sup> Among non-Mid-East OPEC producers, both Indonesia and Nigeria require higher taxes (and/or government shares) on larger fields than on smaller fields.<sup>74</sup> The systems used in all these countries represent one of the ways of reducing contractor risks for a given value of government benefits (taxes, royalties, production shares). Some tax parameters, be it the income tax rate, the royalty rate, production bonus or, in production-sharing contracts, the production-sharing split, must vary according to field size (or, in the absence of good information on field size, according to output), if the reduction of contractor risk for a given value of government benefits is to be achieved.

Field size, however, is not the only determinant of "discovery windfalls" in existing contracts. Accessibility and deposit quality are often equally important factors. Egypt's tax rates on off-shore drilling, for example, vary in accordance to the accessibility of the field. Egypt attempts to extract a larger share of benefits from more accessible (less costly) fields (those in water depths less than 200 meters) by inversely varying the "tax rate" (government share of net production) according to water depth *and* by allowing lower percentage deductions for contractor cost recovery in more accessible fields.<sup>75</sup> Bolivia's uranium taxes vary in accordance with both the size of recoverable reserves and the uranium content of ore. Consequently, the government's share may range from 68% of *net* production for large, high quality deposits (after contractor cost recovery) to 32% for small, low-grade deposits.<sup>76</sup>

### 3. Comprehensive Windfall Taxes

Some countries have eschewed the "market" and "discovery" forms of windfall taxes on all or some of their resource endowments, preferring

---

73. For Liberia, the dividing line where higher taxes on a particular field come into force is 75,000 bbls/day (for the production bonus) and 100,000 bbls/day (for the income tax). For Bangladesh, the line is 100,000 bbls/day. In Sri Lanka, tax rates rise steadily as production increases from 75,000 to 300,000 bbls per day. M. GILLIS, *supra* note 9, Appendix I.

74. For Nigeria, the government's share of net production of oil rises from 65% to 70% when production surpasses 55,000 bbls/day from any one contractor.

75. GILLIS, *supra* note 9, Appendix I.

76. GILLIS & BEALS, *supra* note 6, at 234.

to utilize a single tax device for capture of windfall income of both types. These include Colombia (coal and uranium), Papua New Guinea (copper and oil) and Indonesia (hard minerals). These instruments, labeled in some guises as "resource rent" taxes, share a common feature. They are all imposed on enterprise returns above some threshold or "normal" rate of return chosen by the host government. These devices therefore amount to taxes on *profitability* rather than on profits *per se*. Differences in the way different countries define tax bases render difficult any comparisons between the different forms of comprehensive windfall taxes and between the comprehensive and the other forms of windfall taxes. Illustrations from Colombia and Indonesia demonstrate the point quite effectively. These illustrations also indicate some major pitfalls in the design and implementation of windfall taxes. The *apparent* bases of the comprehensive windfall taxes are similar in both countries: the base is total capital invested.

The Colombian windfall tax on coal applies only when the contractor's return on accumulated investment exceeds 35%.<sup>77</sup> The Indonesian windfall tax on hard minerals is imposed only in those years in which the contractor's return exceeds 15% of total capital. The Colombian tax thus appears to be substantially more lenient towards the foreign investor than the Indonesian tax. In fact, the ultimate differences between the two windfall taxes are more apparent than real: neither will apply except at very high rates of return to foreign *shareholders*.

The two taxes are in fact quite similar in terms of their ultimate impact on investors, aside from differences in the depreciation of the asset base upon which windfall returns are computed. The Colombian tax takes effect when enterprise returns *before* income taxes exceed 35% of total capital; the Indonesian tax applies in years when enterprise returns *after* income taxes exceed 15%. The Colombian tax rate on repatriated profits is 52% (40% on non-repatriated profits). Thus, the 35% return at which windfall taxes apply in Colombia is comparable to an 18.2% after-tax return in Indonesia. In other words, the windfall tax will apply in Indonesia for all after-tax returns above 15%, and in Colombia for after-tax returns above 18.2%. The marginal tax rate applicable to returns in excess of the threshold rate is a flat 60% in Indonesia, while the Colombian windfall tax rate rises from 2% for excess profits of less than \$1 million to 90% for excess, or windfall, returns of about \$124 million per annum.

At first glance, both taxes appear to represent reasonable and effective methods of capturing for the government sizeable shares of windfall income from natural resource projects. These taxes seem reasonable par-

---

77. Carbones de Colombia, Intercor, *Contrato de Asociacion Para Area B Del Cerrejon: Proyecto del Carbon* (Bogota, Enero de 1977), clausula 16.

ticularly because they come into play at rates of return near or only slightly above those prevailing for large U.S. mining and crude oil producers in the period 1971-80. For the period 1971-75, rates of return on stockholder equity for mining and crude oil producers among *Fortune's* 500 equalled 15.6%; for the period 1976-80, the figure was 15.3%.<sup>78</sup> The windfall taxes are computed, however, on the basis of returns to *total capital invested* (debt plus equity capital). Thus, neither the Colombian 7% nor the Indonesian windfall taxes as they are now structured will apply until total returns on *equity* are a substantial multiple of 15% (Indonesia) and 18.2% (Colombia). This result obtains because both the Indonesian and Colombian threshold rates of return, as properly interpreted, apply to corporate profits after both taxes *and* interest are subtracted. Corporate profits thus defined represent funds available to equity owners. Thus, the critical windfall rate of return (threshold rate) depends on the debt-equity (D/E) ratio. In natural resource projects in developing countries, D/E ratios of 3:2 to 3:1 and higher are not uncommon for American-based firms. D/E ratios of 4:1 and even 6:1 are not rare for Japanese firms operating in LDCs. If equity equals 50% of total capital (i.e., a D/E ratio of 1:1), then a 15% return on total capital as calculated for purposes of the Indonesian tax implies a 30% return on equity. At a more common D/E ratio of 3:2, a 15% return on total capital corresponds to a 37.5% return on equity.<sup>80</sup> Returns on equity approaching or surpassing 40% therefore escape payment of windfall taxes in both countries. Returns of

78. Worthy, *The Fortune 500 for 1980*, 103 FORTUNE MAGAZINE, 323, 328 (1981).

79. See GILLIS & BEALS, *supra* note 6, Ch. 2.

80. A simplified example, due to Ralph E. Beals, illustrates the point. Ignoring any revaluation, total capital invested (TC) is defined as in (1) below.

$$(1) \quad TC = TA - CL$$

where TA = total assets  
CL = current liabilities

Total capital can also be seen as (2):

$$(2) \quad TC = D + E$$

where D = long-term debt  
E = equity

Therefore, returns on equity ( $\frac{\pi}{E}$ ) and returns on total capital invested are related by (3) below:

$$(3) \quad \frac{\pi}{E} = \left( \frac{D + E}{E} \right) \left( \frac{\pi}{D + E} \right)$$

where  $\pi$  = corporate profits *after* taxes *and* interest on debt. Thus, if  $E = 0.40 (D + E)$  (i.e., when the debt/equity ratio is 3:2):

$$(4) \quad \frac{\pi}{E} = 2.5 \left( \frac{\pi}{D + E} \right)$$

$$\text{If } \frac{\pi}{D + E} = 15\%, \text{ then: } \frac{\pi}{E} = 37.5\%$$

This says that a 15% return on total capital invested is equivalent to a 37.5% return on equity, when the debt-equity ratio is 3:2. At a still higher debt-equity ratio, the return on equity, for any given  $\pi$ , will of course be higher.

this magnitude rarely exist anywhere in the world, in or outside natural resource projects, and where found are ordinarily transitory. Nevertheless, most comprehensive windfall resource taxes now in force employ "threshold" rates of return in excess of 15% of total capital invested.

In sum, countries that have employed the simpler forms of windfall taxes on resources (those imposed on market windfalls and discovery windfalls) appear more likely to capture significant shares of rent from natural resource projects than nations that have utilized the more sophisticated comprehensive windfall taxes that utilize total capital as the basis upon which windfall returns are computed. The resource rent tax in oil adopted by Papua New Guinea, and an earlier tax applied there to a large copper project, appears largely immune from this criticism. Those taxes are applied once a certain threshold return on total *cash flow*, rather than total capital, is realized.<sup>81</sup>

#### *B. Taxation of State-Owned Natural Resource Enterprises*

It is patently clear that it would be unsound for such nations as Kuwait and Saudi Arabia to automatically reinvest the entirety of their oil earnings in the respective oil sectors of those nations. For that reason, neither country leaves more than a small fraction of surpluses from oil exports in the hands of state oil enterprises, to be spent in the oil sector at the discretion of the firms. The rents, or surpluses, generated within state-owned natural resource enterprises constitute important sources of national savings in all countries that have created such enterprises. These savings are ordinarily viewed as the basis for financing broad development efforts across economic sectors, from agriculture through industry and transport as well as natural resources. The use of natural resource endowments for the benefit of the economy as a whole, rather than for the benefit of much narrower constituencies closely associated with the SOEs themselves, requires explicit mechanisms for transfer of surpluses of natural resource SOEs to the national treasury proper. Absent these mechanisms, LDCs run the risk that surpluses available from exploitation of scarce natural resources will be inefficiently invested in marginal natural resource projects, squandered in activities unrelated to natural resource extraction and processing, or diverted to the personal fortunes of enterprise managers and their political supporters.

Before 1970, the perils associated with the lack of explicit mechanisms for transfer of SOE surpluses to national budgets were not widely recognized within LDCs or developed countries. Reports of bitter experiences over the past two decades with financial excesses and/or ill-advised

---

81. Palmer, *supra* note 55.



investments<sup>82</sup> in state-owned natural resource enterprises in oil (Indonesia, 1971-76; Colombia, 1965-75) and hard minerals (Bolivia from 1951-71, Ghana from 1960-78) have led many LDCs to alter their tax policies toward their SOEs. A growing number of LDCs now subject state-owned natural resource enterprises to the same kinds of fiscal regimes applied to foreign firms.<sup>83</sup> Several others have tightened fiscal rules applied to SOEs in order to insure that natural resource rents are not dissipated in activities of very low national priority. Different nations employ different mechanisms for effectuating transfer of such surpluses. A few nations have utilized, with little success, formal and informal provisions wherein all or part of SOE operating surpluses are consolidated into overall income of the national treasury, e.g., Bolivia. In a few others, e.g., Indonesia and Pakistan, the SOEs pay "dividends" to the state-as-stockholder on the basis of a predetermined, legislatively established rate that is intermittently enforced. Most countries<sup>84</sup> employ taxation as the primary tool for capturing some share of SOE rents for the economy as a whole. Some LDCs require their natural resource SOEs to pay generally applicable royalties.<sup>85</sup> Only a few are fully exempt from generally applicable income taxes,<sup>86</sup> while a somewhat larger number benefit from special income tax credits not available to privately-owned natural resource enterprises. Nevertheless, it is fair to say that, with few exceptions, LDCs generally subject natural resource SOEs to lighter tax and tax-like obligations than those applied to private firms in LDC natural resource sectors. No country attempts to appropriate 100% of rents generated in SOEs: typically, the systems employed leave 40 to 50 percent of profits in the hands of the enterprises themselves, to be used for reinvestment in the natural resource sectors or for other purposes.

Table 1 provides a thumbnail sketch of the methods for surplus transfer in oil, coal, uranium, hard minerals and tropical timber in ten developing countries.

### C. Tax-Like Devices: "Free" Equity

Over the past two decades, natural resource agreements between LDC host countries and large TNCs have increasingly come to involve equity participation by the host government or by its citizens. The large scale of investments in modern natural resource projects has generally meant that equity-sharing in practice has been tantamount to purchase of shares by the host government, given the scarcity of private LDC investors with sufficient capital to enter into large-scale joint ventures with foreign firms.

---

82. See notes 53 and 63, *supra*.

83. See Table 1, Col. 1.

84. See Table 1, Col. 3.

85. See Table 1, Col. 2.

86. See Table 1, Col. 1.

TABLE I  
Summary of Methods of Surplus Transfer: State-Owned  
Natural Resource Enterprises in Developing Countries

Country and Enterprise	(1) Subject to generally applicable host country income tax or to special income taxes?	(2) Subject to production and/or export taxes or royalties?	(3) Subject to required divi- dend payout from after- tax income?	(4) Subject to customs duties?
<b>A. Oil Sector</b>				
1. Argentina (YPF)	yes	n.a.	no	n.a.
2. Bolivia (YPFB)	no	yes	no	no
3. Brazil (Petrobras)	yes (special tax)	no	no	n.a.
4. Colombia (Ecopetrol)	yes (special tax credits)	no	no	partially
5. Indonesia (Pertamina)	yes (special tax)	no	no	no
6. Malaysia (Petrobras)	yes	no	no	no
7. Mexico (Pemex)	no	yes	no	no
8. Pakistan (3 firms)	yes	(two taxes) n.a.	yes	partially
<b>B. Coal Sector</b>				
1. Colombia (Carbocol)	yes (special deductions)	no	no	partially
2. Indonesia (Batubura)	yes	no	yes	partially
<b>C. Uranium Sector</b>				
1. Bolivia (Cobocn)	no	no	no	no
2. Colombia (Coluranio)	no	no	no	no
<b>D. Non-Fuel Minerals</b>				
1. Bolivia (Comibol)	no	yes	no	no
2. Indonesia (2 firms)	yes	yes	yes	yes
3. Mexico (several firms)	yes	n.a.	no	n.a.
4. Pakistan (PMDC)	yes	n.a.	yes	n.a.
5. Zaire (Gecamines)	yes	n.a.	n.a.	n.a.
<b>E. Tropical Timber</b>				
1. Indonesia (Inhutani)	yes	yes	yes	yes

n.a. information not available

Source: Malcolm Gillis, "Methods for Transfer of Surpluses from State-Owned Oil and Mining Enterprises: Taxation and Related Devices in Several Countries" (Report prepared for United Nations Centre on Transnational Corporation, New York, July 1980).

26

While the economic benefits of host country purchase of equity shares are easily overstated, there are often strong noneconomic arguments for equity sharing that often override any commercial considerations in the decision, both from the point of view of the host country and the TNCs.<sup>87</sup>

Beyond purchase of equity in natural resource projects, many LDCs are turning to a different policy on ownership. They are insisting, at the outset of negotiations with foreign natural resource firms, on "free" shares for the government. Receipt of "free" equity by host governments amounts to taxation under another label. In some cases, host governments obtain the "free" shares prior to the beginning of the project, as compensation for the government's granting of rights to mine or to cut timber in government-owned deposits. The large copper projects undertaken during the mid-seventies in Botswana and Panama provide examples of such an arrangement. The governments of Botswana and Panama received, respectively, 15 percent and 19 percent "free" equity at the outset. A major uranium project in Gabon also involved free equity.<sup>88</sup> In other cases, governments have agreed to "pay" for the shares out of future dividends,<sup>89</sup> an arrangement that is equivalent to securing "free" shares at a later date, since the government puts up no money at the outset.

Demands for "free equity" now often comprise a major component in sophisticated bargaining strategies of host countries. In these strategies, "free equity" plays a significant role in efforts to capture differential resource rent from higher quality deposits, and in efforts to reduce the burdens on host country officials charged with negotiation of natural resource agreements. Increasingly, LDC governments have sought to leave only a single major element of the fiscal and financial package in such agreements variable and subject to negotiation. If none of the fiscal terms are variable, then the host government cannot levy heavier charges on the more economically attractive deposits than on lower quality sites. Conversely, if all fiscal terms (income tax and royalty rates, nature of income tax deductions, "free" equity) remain variable and subject to negotiation at one time, providing negotiators with coherent guidelines and even comparing one set of terms with another become virtually impossible. In many cases,<sup>90</sup> governments have found it convenient to limit negotiations to the percentage of "free" equity to be supplied by the foreign firm. Low quality, inaccessible deposits yield low or zero

---

87. For a discussion of the economic and political arguments, *pro* and *con*, of purchased equity in natural resource projects, see Gillis, Wells, *Negotiating and Implementing Minerals Agreements with Multinationals: Some Critical Tax and Developmental Issues* in M. GILLIS & R. BEALS, *supra* note 6, at 163-166.

88. GILLIS & BEALS, *supra* note 6, at 167-170.

89. SMITH & WELLS, *supra* note 21, at 135.

90. M. GILLIS & R. BEALS, *supra* note 6, at 168-169.

share of "free" equity; particularly attractive deposits or timber stands give rise to substantial scope for "free" equity.

#### *D. Contractual Framework for Resource Taxation*

Taxes on foreign operations in natural resources in LDCs until very recently have been imposed almost exclusively in the framework of special mineral agreements with extractive enterprises.<sup>91</sup> The dissimilarity between natural resource activities and industrial and agricultural undertakings, the size of the revenues potentially realizable from natural resources relative to other investments, and generally weak income tax administration, have ordinarily precluded subjecting natural resources investments to generally applicable tax legislation. Rather, the host countries typically have relied on special concession agreements providing terms and regulations specific to particular investments. The pattern is slowly changing: by 1980 natural resource agreements governing entry terms in a wide variety of LDCs had come to involve much less reliance on mine or deposit-specific provisions and much more on laws of general applicability. Thus, Indonesian hard mineral agreements of the late sixties provided for special rules for computing taxable income and special rates of income tax applicable to mining. Provisions relating to income taxes in more recent (post 1972) mineral agreements, however, involved much more frequent reference to rules pertaining to generally applicable taxes on income in Indonesia.<sup>92</sup> Oil agreements in Colombia in the late fifties contained detailed references to special tax provisions applicable to foreign oil companies. By 1981, fiscal terms of oil contracts in that country specify only that foreign enterprises are subject to prevailing taxes on income and remittal of profits. Uranium agreements and service contracts in coal concluded in that same country make no mention of enterprise income tax obligations at all;<sup>93</sup> the applicability of general income tax laws appears to be taken for granted.

Although there is a clear trend, made possible by gradual maturation of LDC tax systems and tax administrations, away from reliance on special contracts and toward general laws in relations with foreign natural resource firms, specialized contractual forms remain, in most countries, essential for dealing with the special characteristics of natural resource extractive activity. The two most widely prevalent contractual forms now in use are contracts-of-work and production-sharing contracts. Service, or management contracts are found in an isolated number of projects, as

91. Special contracts vs. general law in mining agreements were the rule until the early to middle seventies. SMITH & WELLS, *supra* note 21, at 27-37.

92. GILLIS & BEALS, *supra* note 6, at 124-126.

93. GILLIS, *supra* note 19, at 8-15.

in the Colombian coal sector, but true service contracts in natural resources are still relatively uncommon outside of Latin America.

There is a widespread view within developing countries that production-sharing contracts are inherently superior to contracts of work as a vehicle for extracting resource rents for the host country.<sup>94</sup> To be sure, significant differences exist between the two formats governing mineral investment. The basic difference between the two contract formats (as used in practice) is essentially a political one: under production-sharing contracts, title to all natural resources remains clearly in the hands of the host government until after the government splits production with the foreign contractor. In the case of contracts-of-work (as employed in most countries) title to the resources may be vested in the foreign firm. Alternatively, the contracting parties may deliberately allow the terms dealing with title to remain vague. Firms may then represent to banks and other potential leaders that title belongs to the firms, and governments may represent to the public that "rights" to the resources have not been "awarded" to foreigners.

No significant *economic* differences exist between the two formats, however. Nevertheless, early examples of production-sharing contracts (circa 1967-70) seemed to involve greater fiscal benefits to host countries than contracts of work and more traditional "concession" contracts long employed in LDCs. This spawned a mythology concerning the "superiority" of production-sharing contracts (PSCs). Specifically, some observers have maintained that production-sharing contracts (PSCs) are not only easier for host countries to monitor, but that the structure of production-sharing arrangements involves inherent advantages not found in other contract formats.<sup>95</sup> No factual basis supports the imputation of any special degree of effectiveness to either of the two formats, insofar as fiscal benefits to host countries are concerned.

In general, the contract-of-work essentially provides that the foreign firm is considered as a contractor in the employ of the owner of the property right in the resource (the LDC government). The contractor pays income tax on his profits, plus any royalties and other generally applicable taxes. Under classic forms of PSCs, as used for example in Malaysian and Indonesian oil and Bolivian uranium, the government allows the contractor a share in the net *production*, where net production is defined as gross production minus allowable contractor costs in extracting the resources.

Government-contractor splits in *net* production in the oil business, where the PSC is most widely used, are usually geared to the level of

---

94. These views are analyzed in GILLIS & BEALS, *supra* note 6, at 126-131.

95. See GILLIS & BEALS, *supra* note 6, at 132.

daily production. Typical splits range from 65:35 (India) through 70:30 (Malaysia) to 76:24 (Bangladesh) at low levels of production to 80:20 and even 92:8 (Sri Lanka) at high levels of productivity with governments always receiving the greater share.<sup>96</sup> Governments normally may take their share of the split in kind or in cash.

Production-sharing provisions amount to tax arrangements by another name. Any economic differences between PSCs and contracts-of-work insofar as host country taxes are concerned are not inherent, but merely reflect decisions made by governments regarding the basic parameters governing the charges imposed on firms. That is to say, governments may easily adjust income tax rates and royalties under contracts-of-work to achieve the same financial results as changes in production share under a PSC.<sup>97</sup>

Nor are PSCs any more or less difficult to administer than income taxes used to extract resource rents under contracts-of-work. Under *both* contract formats, LDC tax officials must still insure that the contractor does not understate gross income nor overstate costs. Thus, care in verifying net income of natural resource enterprises is no less essential under PSCs as under contracts of work.

There is, however, one sense in which PSCs are inferior to contracts of work where foreign enterprises are involved. Under contracts-of-work, host country income taxes paid by the contractor are clearly *creditable* against *home* country income taxes, while royalties are deductible. Taxes paid in the form of production shares to host country governments, however, cannot always be credited against home country income tax liabilities, but may be merely deductible.<sup>98</sup> Tax *credits* are substantially more valuable to the enterprises than deductions. Therefore, TNCs, particularly American and Japanese-based firms, strongly prefer in most cases that the taxes they pay to host country governments be creditable, not deductible, against home country taxes. Permitting resource taxes to be creditable in home governments to the maximum extent possible benefits the host government, by allowing a higher level of enterprise profits at no sacrifice to the host government levying the taxes. The U.S. Treasury, quite naturally, views host country manipulations of taxes designed to maximize creditability as devices for "picking Uncle Sam's pockets." In sum, differences between the two most widely employed contract formats in LDC minerals sectors amount to little more than differences in labeling.

---

96. See GILLIS, *supra* note 9, Appendix 1.

97. See GILLIS & BEALS, *supra* note 6, at 130-132.

98. GILLIS & BEALS, *supra* note 6, at 130.