

Coastal States and Distant-water Fishing Nation Relations: An Economist's Perspective

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Introduction

The widespread implementation of Extended Fisheries Jurisdiction (EFJ) has confronted coastal states with several resource management problems. One of these consists of the economic relations, if any, that the coastal state should establish with distant-water fishing nations (DWFN's) seeking access to the coastal state's 200-mile zone.

Several of the other papers presented here deal with specific aspects of the issue. This paper, on the other hand, will concern itself with the question of the analytical framework to be used by economists in studying this issue. It will offer some suggestions with respect to possible components of the framework.

In doing so, the paper will restrict itself to the coastal state's perspective of EFJ and the management issues arising therefrom. It goes without saying, of course, that an enlightened coastal state will attempt to acquaint itself with the DWFN view of the world.

Coastal State Obligations and Coastal State Beneficiaries Under EFJ

Before one can discuss appropriate analytical frameworks, it is necessary to deal with two prior questions. The first is concerned with the obligations

of coastal states to DWFN's under the U.N. Law of the Sea Convention and the significance of these obligations. The second is concerned with the designated beneficiaries of EFJ within the coastal state¹.

With regard to the first question, the Law of the Sea Convention, which arose from the U.N. Third Conference on the Law of the Sea, has yet to be signed, let alone ratified, by several important maritime nations. The Convention may never achieve the status of international treaty law. Nonetheless, it now seems to be generally accepted that Part V of the Convention on the Exclusive Economic Zone (United Nations, 1982) has achieved the status of customary international law (Fleischer, 1984) and has come to provide most, if not all, of the "rules of the game" under EFJ. Even the United States, the most prominent of the nonsigners of the Convention, has accepted the concept of the Exclusive Economic Zone (EEZ).² Hence, when one considers coastal state obligations to DWFN's, as set forth in the Convention, there is little question as to the significance of these obligations.

Within Part V of the Convention, the articles of greatest relevance to the coastal state-DWFN issue are Articles 56, 61, 62, 63 and 64. The first three are of prime importance.

Article 56 accords the coastal state "sovereign rights for the purpose of

exploring and exploiting, conserving and managing. . ." living (as well as nonliving) resources within the state's EEZ (United Nations, 1982). As such, the Article, to all intents and purposes, grants the coastal state property rights over the fishery resources within its 200-mile zone. The one possible exception consists of the highly migratory species (i.e., tunas), about which there has been great controversy. This will be commented on later.

An apparent major qualification to the coastal state's fishery property rights, a qualification of direct relevance to coastal state obligations to DWFN's, is to be found in Article 62. Article 62 contains the "surplus principle," which can be stated briefly as follows. For each fishery within its 200-mile zone, the coastal state is to determine its harvesting capacity in relation to the total allowable catch (TAC) set for the fishery. Where the harvesting capacity falls short of the TAC, a surplus is deemed to exist. Article 62 calls upon the coastal state to give "other states" (DWFN's in particular) access to the surplus (United Nations, 1982).

I have argued many times (e.g., Munro, 1985a) that, from an economic standpoint at least, the surplus principle is largely empty. Under Article 61, the coastal state is given unambiguous power to set the TAC's for the relevant fisheries. Hence, there is no legal reason why a coastal state could not eliminate surpluses through adjustments of the TAC's.³ More impor-

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¹To use some of the economist's jargon, when we consider relevant coastal-state fisheries and the economic benefits flowing therefrom, we must ask whose objective functional is to be maximized through time.

²A Presidential proclamation in March 1983 announced the adherence of the United States to the EEZ concept.

³It is true that, if the coastal state sets TAC's which the international community deems to be outrageously low, the coastal state may well encounter severe enforcement difficulties.

tantly, Article 62 gives the coastal state very broad powers in imposing terms and conditions of access upon those states seeking access to the "surpluses." In no sense whatsoever is the coastal state expected to give DWFN's free access to the "surpluses." Indeed, with a modest amount of imagination, a coastal state could impose a set of terms and conditions that would discourage all DWFN's seeking access to the aforementioned surpluses.⁴

Article 62 does call upon coastal states wishing to remove DWFN fleets from their zones to allow for a phase-out period to avoid undue dislocation to the DWFN's. Beyond that, however, it is difficult not to accept the following conclusion of William Burke of the University of Washington and specialist on the Law of the Sea: ". . . the coastal state is given substantially complete discretion to manage the fisheries for its own exclusive interests, however, narrowly and selfishly conceived they might be" (Burke, 1983: 46).

The one disputed exception to coastal state property rights, highly migratory species, is covered by Articles 63 and 64. Coastal states are admonished to cooperate with neighboring coastal states and with DWFN's, where appropriate, in the conservation of these resources. One DWFN, the United States, pressed the need for cooperation to the point of arguing that coastal states should not have management control over, let alone property rights to, highly migratory species. Rather, such resources should be seen as international common property that properly should be managed by international bodies having full DWFN participation.

This position led the United States into conflict with the Pacific Island Nations, a conflict which was eventually resolved through treaty negotia-

tions. A treaty was signed in April 1987, and at the time of writing awaits ratification. The outlook for ratification is excellent.

Though not a lawyer, I would argue that, by signing the treaty, the United States has gone a very long way in conceding that coastal states do indeed have property rights to highly migratory species. While the treaty provisions apply only to U.S. fisheries relations with a limited number of coastal states, it is difficult to believe that these provisions will not in time influence American relations with all coastal states having highly migratory species that pass through their EEZ's.

Thus, coastal state property rights to fishery resources can be seen as being more or less complete. Hence we conclude that the "surplus principle" is largely devoid of economic content. From this it follows that, if there is to be a DWFN presence in a given coastal state's EEZ over the long run, it will be because it is in the selfish interest of the coastal state for there to be such a presence.

To determine whether it will be in the selfish interest of the coastal state for there to be a DWFN presence in its zone, we must answer the second prior question, namely, "Whose benefits from the relevant fisheries are to be maximized through time?" The obvious response is that the coastal state will simply maximize its own benefits from the relevant fisheries.

Such a response is inadequate, not because the coastal state should be concerned with the needs of others, but rather because the response is too vague. Should the response be taken to mean that the benefits of the nation as a whole from the fisheries are to be maximized? Or does the response really mean that the benefits of the fishing regions of the country are to be maximized? Alternatively, is the real concern with the benefits of the domestic fishing industry from the fisheries? If the fishing industry benefits are to be maximized, then should the harvesting or processing sector be favored?

Until this set of questions is dealt with, it is not really possible to analyze

sensibly the issue of coastal state-DWFN economic relations. There is, for example, no guarantee whatsoever that policies designed to maximize the returns from the relevant fisheries to the domestic fishing industry will also maximize the returns from these fisheries to the nation as a whole.

If the question of the object of fisheries management is left unresolved, policies pertaining to the coastal state's economic relations with DWFN's are likely to be confused, if not destructive.

Most coastal states, of which I am aware, claim that their objective in managing fisheries within their EEZ's is to maximize the national benefits from these fisheries through time. It shall, therefore, be assumed in the discussion to follow that the coastal state's fisheries management objective is in fact that of maximizing the flow of national benefits from the fisheries. As a first approximation, we can measure these benefits in terms of net contributions to the coastal state's national income.

It needs to be stressed, however, that if the real objective of fisheries management is other than that of maximizing the national benefits from the fisheries, what follows may require drastic modification.

Potential Benefits of Long-Term Coastal State-DWFN Arrangements and Infant Industries

We come now to consider the potential benefits to a coastal state from long-term arrangements with DWFN's, stressing the adjectives "potential" and "long-term." If we are concerned only with short-term, essentially phase out, types of arrangements, the interest provided by the arrangements is extremely limited. Potential is emphasized because if the benefits are positive, there is no assurance that they will be realized. Such benefits can easily be dissipated through poorly constructed sets of access terms and conditions. Later I discuss the question of access terms and conditions.

It is not too great an exaggeration to say that, at the dawn of EFJ, the gen-

⁴Article 300 of the Convention, the "Good Faith and Abuse of Rights" article, does, according to many legal authorities, imply that the coastal cannot impose terms and conditions of access which are clearly designed to deny DWFN's access (Burke, 1983). Imaginatively designed terms and conditions, of course, could effectively bar DWFN's without giving them a basis upon which to invoke Article 300.

eral view among coastal states was that the benefits to them of a long-term DWFN presence in their zones were seen to be nonexistent, if not negative. It seemed obvious that, if a coastal state were to capture the full economic benefits from its EEZ, it should remove DWFN fleets from 200-mile zone with all possible speed and replace their activities with domestic harvesting and processing.

While this view is still prevalent, we do now have cases in which coastal states are making explicit references to long-term arrangements with DWFN's or are prepared to concede that such long-term arrangements are a distinct possibility. I have argued on several occasions that there are sound economic reasons why such long-term arrangements might be considered, reasons which can be derived from an application of rather elementary international economics (Munro, 1981, 1985a, b). The tools of international economics also prove to be very useful in analyzing the arguments against such long-term arrangements. I shall review the earlier applications of international economics to coastal state-DWFN arrangements and introduce some important qualifications and additions ignored in the earlier treatments.

During the Second International Institute of Fisheries Economics and Trade Conference, New Zealand economists, Kerr and Sharp (1985:268) wrote that "Co-operative agreements provide coastal states with an opportunity for developing their exclusive economic zones, and foreign partners with an opportunity to utilize a resource. The advantages of such cooperation may be found in differences that exist between the partners with respect to endowments of: information . . . technique, capital . . . natural resources."

If we were to restate this argument in the language of international economics, we would say that such cooperative arrangements may make economic sense for a coastal state because the DWFN('s) possess a comparative advantage in the provision of certain harvesting and/or processing

services.

One can think of the coastal state "hiring" DWFN's to provide harvesting/processing services, or alternatively, one can think of the coastal state "importing" such DWFN services. Expressed in this fashion, the argument on behalf of long-term coastal state-DWFN arrangements, as seen from the coastal state perspective, is simply a variant of the argument for free trade.

Thus, suppose that in a particular fishery within a coastal state's EEZ, DWFN's possess a comparative advantage in harvesting the resource vis-a-vis domestic harvesters. A free trade type of argument would state that the coastal state should avail itself of the cheaper DWFN harvesting services. The argument would continue that by so doing the coastal state would enhance the fishery's contribution to its national income. Whether such an arrangement should be of short or long term would depend upon whether the comparative advantage of the DWFN proves to be of short or long term.

If the DWFN's possess a comparative advantage in processing, rather than harvesting, the argument is less obvious. Nonetheless, it does not require much skill as an economist to demonstrate the argument's validity in this case. One can indeed maintain that the fishery's contribution to the coastal state's national income will be enhanced if the coastal state avails itself of the DWFN's processing services.

It can further be maintained that comparative advantage should as well dictate the structure of the coastal state-DWFN arrangement. At one extreme, the DWFN's might exhibit a comparative disadvantage in the provision of all relevant harvesting and processing services. Then there should be no arrangements with DWFN's based on the fishery in question.

At the other extreme, DWFN's may possess a comparative advantage in all aspects of harvesting/processing, in which case a "fee" fishing type of arrangement would be appropriate. The DWFN fleets would both harvest the resource and process the catch in return for a "fee" (e.g., a tax on catch

or on effort). Between those extremes, it might be found that comparative advantage dictated a joint venture type of arrangement in which some of the harvesting/processing services would be provided by the DWFN fleets and part by coastal state entities.

Many factors can give rise to DWFN comparative advantages. No attempt will be made to discuss them here as they are analyzed in detail elsewhere (e.g., Munro, 1985a). Examples are relative factor endowments or seasonality conditions.

In my previous papers on this topic, the unfortunate impression was created that the dictates of comparative advantage will lead to an either/or result. That is, comparative advantage would result in a particular harvesting or processing activity being carried out exclusively by domestic entities or exclusively by DWFN fleets.

This is the equivalent of complete specialization in international economics. Every student of this branch of economics is taught that, while complete specialization is possible and observable, it is not the usual outcome. More commonly, as specialization begins to take place, relative foreign and domestic cost change with the consequence that incomplete specialization occurs.

A particular country may have a clear comparative disadvantage in the production of commodity X. Nonetheless, it might be found that if the country permitted the unhindered importation of commodity X, then the country would still have a small, but entirely viable, X industry.

In the context of fisheries, incomplete specialization could be illustrated as follows. In a particular fishery within a coastal state's EEZ it is found that the DWFN's have an unequivocal comparative advantage in the provision of all harvesting and processing services. The coastal state places no hindrances on the establishment of cooperative arrangements with the DWFN's. Nonetheless, there emerges over time a small, but fully competitive, domestic industry based on the fishery and engaged in both harvesting and processing operations. Optimal

policy would result in the balance between domestic and DWFN operations being such that the fishery's contribution to the coastal state's national income was maximized.

An example is provided by the Pacific Island Nations. Small domestic tuna industries exist. It is anticipated that such domestic industries will expand and multiply over time. Yet it is also anticipated that DWFN's will play a major role in the Island Nations' tuna fisheries for a very long time indeed (Clark, 1985).

The arguments on behalf of long-term arrangements with DWFN's are straightforward. Those against, on the other hand, are complex and the source of considerable controversy. There is no controversy, let it be noted, however, in those instances in which harvesting/processing comparative advantages clearly lie with the coastal state. There would then be general agreement within the coastal state that no arrangements with DWFN's, other than phase-out arrangements, would be justifiable.

Rather, controversy arises in those instances in which the comparative advantage in harvesting and/or processing clearly lies with the DWFN(s). In such instances, the arguments against long-term arrangements with DWFN's are, upon inspection, seen to be really arguments for the protection of the domestic harvesting or processing sector. Thus, the controversy which arises can be seen as a free trade vs. protection argument. The relevance of international economics to an analysis of the controversy is obvious.

I might note in passing that the instruments of protection seldom, if ever, take the textbook form of tariffs and quotas. Rather, the protection is to be found in the terms and conditions of access. An example, would be the discriminatory harvest allocation system employed both in Canada and the United States.⁵

⁵The allocation system, about which more will be said later, operates as follows: A TAC is set for a particular fishery. Wholly domestic operations have first call upon the TAC. If there is a residual, joint-venture operations then have a claim. If there is still a residual, it is allocated to wholly DWFN operations.

As is noted in every standard text in international economics, the argument for free trade is essentially a global argument. Free trade, it is alleged, will lead to an optimal allocation of world resources from which all stand to benefit. Most trade economists will concede, however, that limited protection may benefit individual countries. Since our concern is with individual coastal states, not the world at large, the arguments for protecting domestic harvesters and processors cannot be dismissed out of hand.

The aforementioned economists, who concede that protection may be valid from the perspective of an individual country, proceed to divide the arguments for protection into two categories: Legitimate and illegitimate. The test of legitimacy lies in whether the protection being prescribed will lead to an enhancement of the country's national income. Illegitimate arguments for protection, if accepted, may well result in certain industries, groups, or regions benefiting. The benefits of protection will, however, come at the expense of the rest of the country.

So called illegitimate arguments for protection, while being rejected by most economists, often have immense political appeal. This is no less true in the area of fisheries and EFJ than it is in ordinary commodity trade. Let one example suffice. For want of a better term, I shall refer to the argument as the "value added" argument.

As a first approximation, the contribution of a domestic industry to the country's national income is equal to its value added.⁶ Now suppose that a country both produces and imports commodity Y. The domestic producers of Y argue for protection on the grounds that, if imports are curbed, the domestic Y industry's value added will expand. Thus the industry's contribution to the national income will be increased. Without protection, value added will continue to be lost to foreigners.

⁶Value added can be measured by summing the industry's profits and its payments to the owners of "primary" inputs (e.g. labor, capital, natural resources) employed by the industry.

In the context of fisheries and EFJ, the argument tends to appear in the following fashion. If the existing DWFN fleets operating in the EEZ are forced out by appropriate access terms and conditions, they will be replaced by domestic harvesters/processors. Thus the domestic fishing industry's value added and the industry's contribution to the national income will increase. If the foreigners are permitted to continue unhindered, value added will go on being lost to the foreigners.⁷

The flaw in the argument is easy to detect and should be obvious to any competent student in a principles course in economics. If the domestic industry in question is protected, its value added per period of time can indeed be expected to increase. However, the labor, capital, and natural resources giving rise to this increased value added will be drawn from other activities in the economy.⁸ Hence value added in other parts of the economy will fall. The net contribution of protection to national income could well be negative.

Of the legitimate arguments for protection, the one with greatest relevance to the coastal state-DWFN arrangement debate is also the most famous of such arguments. It is the infant industry argument, which is in reality an argument for temporary protection. It rests upon the premise that the country has a latent comparative advantage in a particular activity.

The argument runs that, while the country has a latent comparative advantage in the activity, newly established domestic firms attempting to exploit the advantage cannot survive in

⁷A related argument arising in the case of "fee" fishing runs as follows. DWFN's pay the coastal state an amount equal to some small percentage of the gross commercial value of the catch, say 5 percent. If the DWFN's were replaced by domestic harvesters and processors, 100 percent, rather than 5 percent, of the benefits would accrue to the coastal state. Presumably what the supporters of the argument have in mind is that the full value added will be captured by the coastal state, rather than the DWFN's. The value added is, of course, significantly less than 100 percent of the gross commercial value of the catch.

⁸Unless these inputs would otherwise have been unemployed. Then the argument for protection would become the quasi-legitimate employment argument for protection.

the face of competition from well established foreign rivals. The infant domestic firms should, therefore, be protected until they have gone through the necessary learning stage. Once the firms have completed this stage, they will be fully competitive and the country's comparative advantage will stand revealed. The walls of protection can then be dismantled.

The argument is particularly relevant to EFJ because EFJ has not led to a situation in which existing domestic harvesting/processing activities are endangered by competition from DWFN's. Rather it has led to a situation in which domestic harvestors/processors wish to undertake new activities, but doubt they could survive in face of competition from well entrenched DWFN rivals.

In previous papers (e.g., Munro, 1985a) I have stated that the infant industry argument applied to coastal states and EFJ might run as follows:

"Prior to E.F.J. international fisheries, subsequently to be encompassed by the [coastal] state's EEZ, held little or no interest to the coastal state fishing industry. The fisheries may have required capital intensive operations with specialized gear/and or vessels, while the fisheries themselves were subject to non-existent or weak management. Thus the investment required was deemed to be excessively risky. The risk for distant-water nations, whose fleets moved throughout the world, was far less.

"Now that the fisheries are under coastal state management, the argument continues, the fisheries are of much greater interest to the domestic industry. Domestic harvestors and/or processors cannot, however, compete unprotected against well established distant-water fleets. If protection for the coastal state industry were forthcoming and maintained until the domestic fishing industry had passed through the learning and development phase, then the coastal state's comparative advantage, now latent, would be revealed" (Munro, 1985a:9).

Both the United States and Canada

provide clear examples of the application of this argument. One such example is provided by the groundfisheries off Alaska. The fisheries have, since the late 1970's, been dominated by joint ventures in which U.S. trawlers harvest the resource and deliver the catch to foreign processing vessels. There is now, however, rising interest in U.S.-owned processing vessels. Protection is demanded by the owners of these vessels. The infant industry argument is brought to bear.

Indeed, in a statement by the Alaska Factory Trawler Association, it was maintained that "...we are a fragile 'infant' industry." The statement then went on to insist on more rigorous measures to remove the foreign rivals from the U.S. EEZ.⁹ It can be asserted without fear of contradiction that a lengthy search would not be required to find additional infant industry examples among other coastal states.

While the infant industry argument is certainly legitimate, there are counter arguments which need to be taken into account. The standard ones are that: 1) It is very difficult to determine a priori which infants do in fact have reasonable prospects of achieving maturity, 2) in those instances in which the infants do achieve maturity, one still has to weigh the costs of protection against the benefits from bringing the industry to maturity and 3) even when the infant does reach maturity and when the potential net benefits of protection prove to be positive, it becomes politically very difficult to remove the protective barriers once such a removal is called for.

Thus the risk exists in applying the infant industry argument that the latent comparative advantage will prove to be nonexistent. The infant is either terminated, often painfully, or is allowed to linger on—a permanent burden to the economy. Alternatively, the industry may grow to maturity, but exert sufficient political pressure to maintain the protection indefinitely at the ex-

⁹Testimony of E. D. Evans, representing the Alaska Factory Trawler Association, cited in Pereyra 1986. For a discussion of the application of the infant industry argument in Canada see Munro (1985b).

pense of the rest of the economy.

In the case of fisheries, there is yet another problem with the infant industry argument, which has become particularly visible in Alaska. This is the fact that, within a given EEZ fishery, there may be two "infants" to contend with, a harvesting sector "infant" and a processing sector "infant." Giving support to one "infant" can easily come at the expense of the other. Thus, for example, granting protection to the processing sector "infant" . . . might well damage the harvesting sector "infant," which might achieve most rapid growth by being permitted to enter into joint ventures with foreign offshore processors. (Alverson, 1987, presents examples of where this problem has emerged.)

There is a second legitimate argument for protection that proves to be relevant to fisheries and which, until recently, the author believed wrongly to have no relevance at all. This is the "terms of trade" argument. The argument states that by introducing barriers to import or export flows, a country may be able to shift the terms of trade in its favor. The argument rests critically upon the country having some degree of monopoly and monopsony power in the sale of exports and purchase of import products respectively and rests critically as well upon the assurance that the country will not be subject to extensive retaliation by its trading partners.

The application of this argument to fisheries, of which this author is aware, appears in the United States in the guise of the "market void theory." It is maintained that if DWFN fleets as harvesters and processors are denied access to the Alaskan groundfisheries, then a "void" will be created in foreign groundfish markets. The consequence will be that prices of U.S.-harvested and processed groundfish products will rise. The debate over this argument has focussed on the degree of U.S. monopoly power in this area (Pereyra, 1986).

There is another aspect of protectionism, outside of the arguments for and against protectionism, which is relevant, and which has largely been

ignored in the literature. This is the concept of "effective," as opposed to nominal, protection. When a domestic industry is protected, the protection does, in fact, apply to the industry's value added. It, therefore, becomes important to know whether the costs of the intermediate inputs are influenced by protection. If such costs are greatly increased by protection, the "effective" protection enjoyed by the industry could in fact be negative.

Thus in the case of fisheries a domestic harvesting or processing sector may appear to be uncompetitive with respect to DWFN's only because the costs of intermediate inputs are inflated by protection. For example, suppose that domestic fishermen and offshore processors were compelled to purchase their vessels from heavily protected, high-cost domestic shipyards, while DWFN fleet owners were able to purchase their vessels on the world market. In assessing the degree of protection actually enjoyed by the domestic fishing industry, it would be essential to acknowledge the inflated capital costs of the industry.

If one were asked to provide examples of protectionism under EFJ, it would be necessary to look no further than North America. Both the United States and Canada follow essentially the same policy, which is one of high protectionism. In both countries, protectionism appears, as indicated earlier, through the harvest allocation system. First preference is given to operations involving domestic harvesting and processing, second preference to joint ventures, and last preference to foreign "fee" fishing.

Off Canada's Atlantic coast, where most of Canada's gains from EFJ lie, DWFN participation in Canada's EEZ fisheries has steadily dwindled and in time will likely approach zero. In the groundfisheries off Alaska, foreign "fee" fishing, or directed fishing, declined rapidly to be replaced by joint ventures (Pereyra, 1986). Reference has been made to the increasing interest in U.S. owned and operated factory trawlers. It is now being argued that this interest may well lead to the phasing out of joint ventures within a

decade (Alverson, 1987).

While it is easy to find examples of protectionism in coastal state-DWFN relations, it is more of a challenge to find cases in which something approaching a free trade policy is adopted. No coastal state, of course, follows a pure "free trade" policy.

Nonetheless, while the search is challenging, examples can be found. There is one case which we have already raised, the Pacific Island Nations which collectively lay claim to high-valued and immense tuna resources. While some of the Island Nations have infant tuna industries, which they intend to foster, it also remains true that they have established, with formidable skill, long-term agreements with DWFN's (Clark, 1985). It is also clear that their stated object of management is clearly that of maximizing national benefits from the fisheries (Kotobalavu, 1987).

It can be argued that the Pacific Island Nations have little choice, because they lack and can expect to lack, the capital to exploit fully their tuna fisheries. This can be debated. The second example, however, is one in which the coastal state clearly could in time exploit the relevant fisheries with fully domestic harvesting and processing operations if it so desired. The example is New Zealand.

New Zealand instituted an EEZ in 1978. The most important species acquired were demersal species such as the high valued orange roughy. After several years of experimentation and uncertainty with respect to long-term fisheries policy, there was implemented in 1982 a deep-water trawl policy based on individual transferable company quotas.

Companies acquiring these quotas are required to have 35 percent of the harvests arising from these quotas processed in New Zealand. Beyond this, however, the companies can exploit the quotas as they see fit. If a company chooses to employ its domestic harvesting vessels and processing capacity, it may do so. If it chooses to employ foreign vessels through charter for harvesting and/or processing, it may also do so. The only restrictions

are that charter fees are to be expressed in cash rather than kind and that prices received from foreign vessels are to be realistic market prices (Major, 1985; Clark and Duncan¹⁰).

The advantages of the scheme were and are, first, that aside from the 35 percent rule, it gives comparative advantage full reign. Secondly, the scheme is such that, once in place, it proved to be highly acceptable to the industry. Under this approach, the company quota holder which follows the dictates of comparative advantage enjoys higher profits.

It should be added in passing that part of the resource rent is garnered for public purse. The government enjoys part of the return on the fisheries through the income tax, but also through a per tonne royalty which varies according to species (Major, 1985).

Analyzing Terms and Conditions of Access

The discussion of comparative advantage and of free trade vs. protection is set in terms of the potential benefits to coastal states from long-term arrangements with DWFN's. The existence of such potential benefits provides no guarantee, however, that the benefits will in fact be realized. As suggested earlier, the potential can be easily lost if the terms and conditions of access which govern DWFN participation in the coastal state's fisheries are badly designed. Let two examples suffice.

First, suppose that the coastal state enters into "fee" fishing arrangements, but then binds itself to a policy of collecting fees only for the purpose of covering administrative and surveillance costs. In essence, this is the equivalent of willfully overpaying foreigners for harvesting and processing services. Hence, the returns to coastal state from the arrangements will be far below the potential.

¹⁰Clark, J. N., and A. J. Duncan. 1986. New Zealand's fisheries management policies—past, present, and future: The implementation of an ITQ-based management system. New Zealand Ministry of Agriculture and Fisheries, Wellington, unpubl. rep.

Secondly, suppose that the terms and conditions of access tolerate, or indeed encourage, wholesale cheating by the foreign fleets. The collapse of the arrangements would then be all but assured.

In deciding how to analyze the design (from the coastal state's perspective) of the optimal set of terms and conditions of access, it is important to consider the nature of the relationship between the coastal state and its DWFN partner(s). When two neighboring coastal states negotiate over the management of a shared fishery resource, it is reasonable to think of the relationship as being one that is more or less between equals. By way of contrast, when a coastal state enters into negotiations with a DWFN, the relationship is distinctly hierarchical in nature.

Under Part V of the Law of the Sea Convention, the coastal state has clear property rights to the relevant fishery resources. I argued earlier that the so called "surplus principle" is largely empty and that ambiguities over highly migratory species are being resolved in the coastal states' favor. To all intents and purposes, the coastal state can grant, or refuse to grant, access rights to DWFN's as it sees fit.

In discussing the potential benefits of coastal state-DWFN arrangements, I wrote in terms of the coastal state "importing" the harvesting/processing services of DWFN fleets. I said as well that one can just as easily talk of the coastal state "hiring" the DWFN fleets to perform harvesting/processing services.

In an ideal world, as seen from the perspective of the coastal state, the DWFN "hireling" would be subject to the absolute control of the coastal state. The DWFN fleets would not merely refrain from poaching, they would follow, with precision, a harvesting profile through time dictated by the coastal state. The aforementioned terms and conditions would be orders and requirements to be followed and observed without question.

The real world is, of course, never ideal. The coastal state cannot exercise perfect control over the DWFN "hire-

lings." In particular, it cannot exercise perfect control over the DWFN's harvesting policies. It may be able to prevent DWFN fleets from harvesting beyond certain limits, but it cannot compel the fleets to increase their harvesting if they are underexploiting the resources from the coastal state's point of view. Perfect control over DWFN fleets is too difficult, or more to the point, too costly to achieve. Thus, the terms and conditions of access should be viewed, not as a set of orders, but rather as a set of incentives designed to persuade the DWFN fleets to act in a manner which the coastal state deems to be satisfactory, if not optimal.

The implication of the hierarchical coastal state-DWFN relationship and the typical coastal state's inability to exercise absolute control over DWFN fleets is that the appropriate analytical framework may be found in what has come to be known as principal-agent analysis.

In such analysis, a principal is seen to acquire the services of an agent or agents. The agent performs certain tasks that will yield benefits to the principal. The principal finds it too costly to exercise absolute control over the agent. Rather the principal must content itself with establishing an incentive system for the agent, which contains within it a reward function. It is generally assumed that, over the course of the relationship, the agent must, if he is to perform, enjoy some minimum return which in turn may be determined by market forces or through bargaining.

Once the incentive system is in place, the agent, will proceed to act in a manner to maximize its own benefits or gains. The principal will enjoy the total benefits produced by the agent's actions minus the benefits accruing to the agent. The principal's objective then is to choose an incentive scheme that will maximize its benefits, given that the agent has some freedom of action and is subject to the condition that the benefits accruing to the agent must not be less than some minimum. (See Clarke and Munro, 1987, for a description of the principal-agent paradigm.)

An example of the application of principal-agent analysis, which is suggestive of the fisheries case, is to be found in the study of sharecropping (e.g., Hurwicz and Shapiro, 1978). The landlord, as owner of the land, is the principal. The tenant farmers, to whom he grants access to his land, are the agents. The landlord's return from the land is dependent in part upon the abundance of crops raised by the tenant farmers. The tenants have considerable freedom of action. The problem faced by landlord as principal is to design an incentive scheme, e.g. a crop sharing formula, that will maximize his returns, given that the tenants have some freedom of action and given that they will not act unless they are guaranteed some minimum return.

In the case of fisheries and EFJ, the coastal state, as owner of the resources, would obviously be seen as the principal. The DWFN's would be seen as the agents. The terms and conditions of access would constitute the incentive scheme.

One attempt to apply principal-agent analysis to coastal state-DWFN relations has recently been published (Clarke and Munro, 1987). The paper is very much a first attempt and, as such, restricts itself to a narrow problem. The problem of surveillance and enforcement, which is in fact a subsidiary principal-agent issue, is pushed into the background. Furthermore, the paper analyzes only "fee" fishing arrangements. (However, one can assert with some assurance that principal-agent analysis will apply to joint-venture arrangements as well.)

The distant-water fleets harvest the resource and in so doing are assumed to produce resource rent. The coastal state, cum principal, is assumed to impose taxes on catch and/or fishing effort. The reward to the DWFN's, cum agents, consists of the resource rent minus the taxes.

Hence, rather than sharing of crops, we have a case of sharing of resource rent. The rent sharing formula—the tax system—constitutes the incentive scheme. While serving to garner a portion of the resource rent for the principal, the taxes serve as well to

influence the DWFN's harvest profile through time. The paper then analyzes the effect of different tax systems in light of the coastal state/principal's goal of maximizing its return from the relevant fishery through time.

It may sound farfetched to place so much emphasis on tax incentives in coastal state-DWFN relations. Yet we have an example of taxes as an incentive scheme from the South Pacific where "fee" fishing arrangements are prevalent. The example appears in a particularly useful recent article on the access arrangements of the largest of the island nations, Papua New Guinea (PNG) (Doulman, 1987).

PNG extracts a return from DWFN fleets by means of access fees. Doulman (1987:19) stated that "By definition access fees are a tax which are essentially designed to extract the resource rent from the fishery; foster operational efficiency in the use of the resource; and provide an instrument for government to regulate, develop, conserve and generally manage the fishery." (See also Clark, 1985:25-26.) The article then goes on to analyze the operation of this tax/incentive scheme in detail.

While it may not in fact be unreasonable to emphasize the use of taxes as an incentive scheme, the paper by Clarke and Munro (1987) is no more than the first step in applying principal agent analysis to terms and conditions of EEZ access. The paper leaves important aspects of "fee" fishing arrangements unexplored. It says nothing about joint venture arrangements and pushes into the background the important surveillance and enforcement problem. What the paper does do, however, is to suggest that

principal-agent analysis may be a fruitful approach to studying coastal state-DWFN economic relations.

Conclusions

In this paper I have been concerned with means of analyzing coastal state-DWFN economic relations, as seen from the perspective of coastal states. The fundamental premise has been that, under the rules laid down by the Law of the Sea Convention, the coastal state need establish long-term arrangements with DWFN's only if it is the coastal state's selfish interests to do so. I then argued that the economics of international trade provides analytical tools that are useful in determining whether, in fact, it is in the selfish interest of a coastal state to establish the aforementioned arrangements.

If there is reason to believe that a long-term arrangement with one or more DWFN's could be potentially beneficial for a coastal state, one then requires means of analyzing from an economic perspective the mix of access terms and conditions open to the coastal state. I then argued that a fruitful approach to this question lies in the application of principal-agent analysis.

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