Interdependencies Among Fisheries Management, Fisheries Trade, and Fisheries Development: Experiences with Extended Jurisdiction

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Passage of the Magnuson Fisheries Conservation and Management Act (MFCMA) brought with it much speculation about its likely impacts on fisheries production and seafood trade. There were those who hoped that the Act would propel the United States into the ranks of the world fishing and seafood exporting powers, largely because of the immense resource base that apparently was brought under U.S. control. Subsequent refinements of the Act, however, represent a recognition that such control did not necessarily translate immediately into the development of this base. Provisions for foreign fishing and joint venture arrangements were included to satisfy world political realities as well as to accommodate needs of the domestic fishing sector. In all, the Magnuson Act appears to be as much an experiment in fisheries development as it is in fisheries management

Moreover, the importance of the Act, perceived in a global context and from an historical perspective, pales considerably when compared with world trends. The global impacts of the Truman Proclamation of 1945 lay the foundation not only for the Magnuson Act, but also for many similar acts and declarations worldwide. Between 1945 and the late 1970's, claims to different parts of the ocean resource zones were declared by other countries. One could argue that the Truman Proclamation brought on the trend of extended jurisdiction (EJ), and that the trend has simply been accelerated by the MFCMA. Presently, practically every maritime nation has made a claim to a Fisheries Conservation Zone (FCZ) or an Exclusive Economic Zone (EEZ).

It is also important to note that these new resource claims have been made by a number of relatively new nations in the wake of the postwar trends in the growth independent nation-states. of This growth of nation-states, which has occurred coincidentally with (and was probably the major fuel for) extended jurisdiction, has in turn fueled an impressive growth in naval arms trade, apparently in an effort to exercise real control over the claimed rights to the FCZ/EEZ's (Morris 1986; Wilson and Morris¹). For many of these countries, fisheries management and enforcement has become a new responsibility.

This paper discusses this new environment and what it means for the development and management of U.S. fisheries resources, with particular reference to international trade. Specifically, we present two views regarding extended jurisdiction which we believe should be considered to understand policy positions on both international fishing and seafood trade issues.

First, we argue that the strength of a nation's property rights over a resource endowment will determine, to a considerable extent, what will be traded. In particular, a resource base claimed by a nation may be utilized in many ways,

depending upon the strength of rights and the costs of other productive inputs, to form a large number of intermediate goods. Other countries may be strong competitors with the United States in the production of intermediate goods and their decisions may affect the management and development policies which we take as a nation. As in agriculture, our potential competitors may turn out to be quite formidable.

Our second point is that to produce reasonable policy for fisheries, an understanding of uncontrollable but highly influential events exogenous to the fisheries sector is of paramount importance. Although the global EJ trend is important, other factors are also driving both fisheries and the other sectors of our economy. We hypothesize that, in the formation of new fisheries policy, due consideration will be given to the comparative roles of these different effects, such as global macroeconomic trends. We discuss each of these points in turn.

A Property Rights Approach to Trade

There is a theoretical basis, as well as a casual empirical basis, for stating that the structure of property rights, as reflected in institutions, is codetermined with both the level of production within a country and the types of goods traded. These rights are based upon a combination of international customary law and the level of defense expenditure and capability. What the country decides to produce and trade is also a reflection of the cost of inputs necessary to the transformation of natural resource bases and of the preferences of the society. For these reasons, it is not likely that the trade envi-

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¹Wilson, J. R. and M. Morris. 1986. The role of defense in the formation and maintenance of property rights: Extended jurisdiction and the Third World. Working pap., 11 p.

ronment for a product such as fish can be completely characterized by looking at the trade statistics for fish. In fact, trade in a number of instruments used in the production of fish can be seen in the world today. Some of these trades may never show up in a balance of payments account. For example, a cash-poor country, with limited access to exploitation technology and with a relatively high cost of capital, may well be attracted to the prospect of being able to sell some intermediate good to avoid investment in either expensive capital or defense and enforcement. For this reason, it seems worthwhile to investigate ways to incorporate the notions of property rights into the discussion of the trade impacts of EJ.

Coastal nations that extend their fisheries jurisdiction can be viewed as having experienced an increase in resources and, hence, increased production possibilities. Conversely, nations whose distantwater fleets no longer have access to fishing grounds now under the jurisdiction of another nation, experience a reduction in production possibilities. The resulting impact on trade could be examined in a manner similar to the way one would analyze the trade impact of economic growth (Batra, 1973; Chacholiades, 1978). Indeed this was done recently by Johnston and Siaway (1985).

However this approach begs an important question. Does the declaration of extended jurisdiction necessarily provide all countries with the same level of ownership of the associated resources and, thus, the same opportunity to exploit fully those resources? We suggest that it does not, and that many of the trading arrangements (e.g., different kinds of joint venture structures) can best be understood by viewing ownership not as something a country has or does not have but, rather, as something held with various degrees of strength. Whether a newly endowed country harvests and sells fish, or sells the "right" to fish, or selects some other resource use alternative is importantly determined by the cost of defining and protecting property rights in the new territory.

Thus it is important to look carefully at the notion of property rights. According to one definition, "A person's private property rights are the expectation that what one decides to do with certain resources will be effectively carried out, or realized" (Alchian and Allen, 1968:98).

Consider the implications of this statement. A person or a nation will possess a right which is conceded to it by the community. For example, rights of "free speech" at the individual level and "rights to impose tariffs" on traded goods at the nation-state level can be strengthened or abridged by the actions of the community at large. However, individuals or nationstates may also possess varying strengths of rights by the maintenance of a threat through, say, defense and enforcement (D&E) expenditure. A combination of community concession and expenditures on D&E constitutes the full complement of ways in which expectations (property rights) are maintained.

We find it useful to think of ownership of a resource in these terms; that is, in terms of the strength of the associated property rights, ranging from weak ownership to strong ownership. The Alchian and Allen (1968) definition allows us to consider the relationship between property rights and institutional arrangements, or claims. A change in institutional arangements, such as EJ, may or may not affect the actual property rights of a nation. This will depend on how expectations change and on what happens to the variance of expected outcomes. It is important to recognize, however, that D&E constitutes, in most realistic situations, a necessary part of rights maintenance. The possession of different strengths of property rights allows different types of activities to take place. Weak rights, or those given by concession, may entitle the nation to a limited range of activities. Stronger rights allow the disposal of resources over a wider range of activities.

Viewed this way, much of the international trade activity following extended jurisdiction can be seen to involve the exchange of bundles of goods and services, including services associated with different levels of property rights. Looking only at data on international trade in fish following EJ may obscure important economic relationships. Our discussion is an extension of the analysis by Sutinen and Anderson (1985), who argue that "the cost of defining and securing exclusive property rights under the new extended jurisdiction regime, is a principal determinant of management measures that eventually will emerge. Thus the presence of enforcement costs may have a significant impact on fish production and allocation in the future as coastal states move to regulate fishing activity in their waters."

We extend this insight to embrace trade. That is, we permit the buying and selling of policing (D&E) activities among countries. A country with new resources to manage and exploit could contract with enforcement agencies-perhaps in another country-to police use of its resources. These D&E-or fisheries management-services could be provided by a country other than the one prosecuting the fishery. However, since "effort" and policing activities are complementary inputs in the harvesting of fish, efficiency may be realized by combining these activities. Thus, as shown below, the decision on how much and whose effort to use in a fishery is simultaneously a decision about the strength of property rights in that fishery. The use of zero policing services, for example, and the resulting "open access" solution is the decision to allow weak property rights to prevail in the fishing zone. Conversely, the extensive use of policing services and the resulting "rationalized" fishery is the decision that strong property rights will prevail. Most arrangements probably lie between these extremes. When a coastal nation imports policing services through the distantwater fleets of other countries or through joint-venture arrangements it is participating in international trade involving fish, fishing rights, harvesting services, and policing services, variously bundled.

Thus, we also extend the notion of Munro (1985) that "if a coastal state enters into a cooperative fisheries arrangement, one can think of the coastal state as importing harvesting and/or processing services from a distant water nation(s)." Specifically, we add policing services they may simply take the form of selfpolicing agreements because a distantwater, rent-seeking fleet may require fewer policing services than would have to be provided by the coastal country—to the packages of goods and services being traded among international participants in the fishery.

Consider this with the use of diagrams. If we look at the relationship between the production of goods and services² and the expenditure of D&E in a country, we can visualize a trade-off curve that has an area of increasing returns to D&E (Fig. 1). This is reasonable: A certain expenditure of factors in the form of D&E not only secures the possible use of productive factors, but also creates an environment conducive to enhanced production. Beyond E', additional inputs of D&E can be produced only by giving up production of other goods. If we assume the existence of community preferences for illustration purposes, and think of D&E as a public "bad" (a necessary evil) or as input used in the production of the other goods, then I is the highest community indifference curve achievable, and the country is at equilibrium at T^* , E^* . The uncontested portion of productivity would be OA. The part which would have to be maintained through D&E is AT^* .

However, D&E expenditures are made, in general, to strengthen or maintain property rights, as we have discussed. This leads us to argue for a reconsideration of the notion of comparative advantage. Economists generally tend to think of comparative advantage under conditions in which all factors of production have strong property rights attached to them. In general, it is further assumed that these rights are costless to maintain. However, in reality, many resource rights are imperfectly defined or weak. Resources in the fishery are simply one example of this. Furthermore, even the maintenance of relatively weak rights is often costly. Under such circumstances, production, trade, and property rights decisions are made jointly.

For example, consider two countries: A, with a new EEZ, and B, with a distant-water fleet. These two countries, because of the uncertainty in dealing with each other, keep a certain amount of their





endowments in defense and enforcement. In addition there exist a number of rules and agreements. Together these activities form the basis of the relative property rights strengths between A and B^3 . That is, for any productive claim, the strength of the rights a country has on that claim depends upon 1) the degree of recognition of the claim by "the world community" and 2) the level of D&E activity in which the country engages⁴.

Thus, the "strength of property rights"

in a resource can be viewed as an argument of the production function associated with that resource. For a given set of (negotiated) rules (no. 1 above)⁵, we can visualize a one-to-one mapping between the expenditure of resources for D&E and the strength of property rights (Fig. 2). Increased D&E expenditures are likely to lead to increased strength of property rights, although such a positive relationship is unlikely to exist for all D&E levels. The precise nature of the relationship is determined in part by the level of negotiation, which is again a function of the

²To avoid the use of three dimensional diagrams (we would need them if the strength of property rights were considered explicitly), we will assume that an "increase in all other goods" means an increase in the physical volume of other goods, the services of which are defined for a given level of property rights.

³For further discussion of negotiated rules and defended rights see Sutinen and Andersen (1985) and J. R. Wilson (1984), The history of extended jurisdiction: Property rights formation and anarchy. Pap. in unpubl. dissert. "Some consequences of extending ocean resource zones." ⁴A certain portion of these claims will have no need of enforcement and defense. For example, in the case of EJ, it may be mutually agreed that permission and guest allocations must be given to visiting fishermen before they can fish.

⁵The authors recognize that for a truly comprehensive look at the relationship between the strength of rights and trade one would have to account for the reasons that negotiation does (does not) occur, and the determinants for decisions to expend valuable resource on negotiated settlements. Explicit treatment of this issue is beyond the scope of this paper, however.



Figure 2.—A production relationship between the strength of property rights (PR) and expenditures on defense and enforcement (D&E).



Figure 3.—Allocation of policing services between foreign and domestic participants in a fishery.

country's endowments. However, it is likely that, throughout some range of D&E expenditures, the marginal return to increased D&E expenditures declines, and beyond some level (E^* in Figure 2) it is negative. Now if B's fleet fishes in A's waters, there will be division of domestic D&E and foreign D&E. A portion of the D&E supplied by the foreign nation is actually the degree of "recognition" of A's claim, which A subsequently does not have to enforce. In the case of policing its own fleet and the activities of third parties (country C), provision of D&E may involve actual resource outlays by Β.

In Figure 3A, S_d and S_f represent the supply of policing services (D&E) by country A (domestic) and country B (foreign), respectively. Curve B_d represents the marginal benefits associated with dif-

ferent levels of D&E expenditures.⁶ Total benefits (*TR*) are given in Figure 3B. The intersection of S_d and B_d is A's autarky position, with a total revenue of R_a . Since A seeks to maximize benefits to the nation, however, the decision makers will select that mix of foreign and domestic D&E expenditures which achieves this. Curve S_{d+f} is drawn to "equate" the marginal costs of domestic and foreign policing. In equilibrium, T_d units will be supplied by the domestic country, T_f will be "imported", and R_{t} revenues are generated. This solution is country A's policy regarding foreign and domestic use of A's fishing zone. It may, for example, describe a joint venture policy under which the foreign partner provides processing services and determines the amount of effort to be devoted to harvesting, perhaps by the domestic fleet. Polic-

⁶The relationship may be thought of as follows: As D&E expenditures increase, so does the strength of property rights, at least over some range. This increases the rent that the fishery resource may earn, up to some maximum. For example, in the standard, static bioeconomic model, a reduction of effort from its open access level leads to rent increases, up to that associated with maximum economic yield. Increases in D&E expenditures may strengthen property rights and lead to increased ability to reduce effort levels. Thus, curve B_d in Figure 3A may be viewed as a relationship between marginal resource rents and D&E expenditures. In a sense, then, expenditures on D&E may be regarded as expenditures on fisheries management.

⁷From Country B. The analysis could be extended to include all foreign countries.

ing of harvest, then, is done by the foreign partner (T_f) and the domestic partner may, through its own policing activities (T_d) , prevent third parties (countries or other domestic harvesters) from prosecuting the fishery. Country A, then, exports a bundle of goods and services that includes fish, harvesting activity, and D&E services. Country B may, for its part, export a bundle consisting of processed fish, processing services, D&E services, etc.-essentially a barter transaction-and/or may make direct payment for imports (e.g., rental payments for joint venture participation; payments to fishermen). This is a quantitatively and qualitatively different trade solution than the result associated with, say, country A's selling the right to fish (in exchange for a royalty) to country B.⁸ However, a simple inspection of fish trade data would not reveal this as there is no reason to believe that the quantity of fish actually delivered to country B under the two arrangements is different. Indeed any of a large number of solutions is possible and the difficulty with using the standard trade model to analyze them is that, in that model, the strength of property rights is determined outside of the system. Here, however, we are arguing for treating it endogenously.^{9,10}

Thus we are led to conclude that there is a strong link between fisheries management and seafood trade, and that this link has become more clear with extended fisheries jurisdiction. Samples (1985) outlines the contractual terms of two international tuna joint ventures in the southwest Pacific in which the host countries granted sole rights (ranging from harvest rights to processing and ex-

port rights) to the joint venture. As Clark and Munro (1980) and Hannesson (1985) point out, such monopoly/monopsony power can lead to resource utilization that is consistent with optimal fisheries management. Gains accrue to both the host country and its foreign partners. To realize these gains, however, trade in intermediate goods (D&E services, harvesting services, processing services, etc.) takes place. These transactions are internal to the joint venture and, as such, may not enter the trade statistics of the trading countries. Tomlinson and Vertinsky (1975) make a similar argument for licensing schemes under which foreigners are charged for the right to fish and for policies to encourage the establishment of foreign-owned harvesting and processing companies within the host country's national jurisdiction.¹¹ What has the U.S. received for granting access to guest fishermen? In addition to monetary payments there are data sets, technology, collaborative scientific research, semiprocessed product and, in some cases, monitoring and enforcement.12 Whatever nominal claims are made by a country, it is the institutional arrangements chosen that determine the commodities traded.

Joint venture catches by U.S. flag vessels rose from 10,600 to 911,200 metric tons between 1979 and 1985 (NMFS, 1986). These "exports" took place under different property rights arrangements than did the exports of seafoods through more "traditional" marketing channels. As public policy regarding management of the U.S. FCZ unfolds, these arrangements will change and be accompanied by shifts in trade patterns. Property rights and trade are intimately linked. The fish-

¹¹With respect to joint ventures, Tomlinson and Vertinsky (1975) argue that "one of the problems in policing the new coastal limits for nations without a naval tradition will be the lack of effective domestic deterrent ability" and that "control of sufficient (military) force. . to exercise sovereign rights. . .(and). . .access to adequate information to apply such force in time for it to take effect. . .will be enhanced by local participation in fishery joint ventures." We suggest that, with long term contracts (Samples (1985) describes 10-year contracts, subject to renewal), some joint venture arrangements provide incentives for the foreign participant to provide the policing services.

¹²Although, in most cases, this has been part of the package exported.

ery provides an opportunity for improved understanding of this fundamental relationship. We look next at how some recent models of trade in intermediate goods can be modified, along lines suggested above, to help explain the differences in responses of various coastal countries to extended jurisdiction.

Extended Jurisdiction and Trade in Intermediate Goods

The consequences of a country shouldering the development of a newly found resource have been studied in detail, with one of the more recent contributions by Cassing and Warr (1985). The "Dutch disease" is the name given to the observed contraction of other domestic industries in adjustment to the needs to exploit newfound resource wealth. This phenomenon, which was first seen in the developed European countries shortly after the discovery of oil in the North Sea, seems to be the practical result of a strong rights system coupled with largescale resource discovery and attempts at exploitation. It is also the result of the size of the resource find in relation to the physical and economic size of the country. Whether or not the "Dutch disease" sets in may be determined by barriers to the inflow of foreign capital.

As Cassing and Warr (1985) note, the disease can be brought on by restrictions in the flow of productive inputs into a country from foreign sources. Conversely, its effects can be dampened by the encouragement of these types of enterprises. This discussion may be of little direct interest to managers of the U.S. fisheries sector, since the U.S. is unlikely to be affected by the "disease" in the course of developing its fisheries in the wake of EJ.

However, the likely resource supply competitors of the world, the developing countries, confront this routinely as a real policy problem which must be addressed in the course of their own country development. That is, for a country which is relatively undiversified, militarily weak, and small, the EJ claim can be the beginning of a difficult balancing act between D&E expenditures, access to necessary technology, and the satisfaction of employment and other development objectives within the country.

⁸Suppose, in Figure 3, that the relevant total revenue curve is TR', not TR, and that the associated marginal benefit curve is B'_d . It does not pay country A to participate directly in utilization of its fishing zone.

⁹Suppose that, in Figure 3A, curve S_f were the domestic supply of policing services and S_d were the foreign supply. Suppose, further, that TR' were the relevant total benefits curve with B'_d its marginal counterpart. In this case, there are strong incentives for a purely domestic fishery, with no direct foreign participation. This may be the case for the United States.

¹⁰As Doug Lipton argues in his discussion, the model can be extended to include elements of imperfect competition. This is a potentially fruitful area for further analysis.

As Svejnar and Smith (1984) relate, most developing countries have long wrestled with the issue of appropriate institutions for "indigenization" of production. The observations of these and other authors suggest the existence of a "scale" of productive involvement by a country, ranging from the simple licensing of a transnational corporation to the largely domestic production found in more diversified countries. As more bargaining power ("perceived rights") is acquired, these countries seek to avoid many of the negative impacts that are present in some of the more "primitive" business arrangements. However, the realization of this objective must be balanced against the negative impacts of isolationist development policies. Therefore, a whole range of institutional relationships can arise, each of which is associated with a different level of property rights. The trick for the leaders of the country, however, is to choose a D&E investment which will not only match the resources of the country with the requisite productive inputs, but also the needs of the country. To this end, there has been considerable interest not only in the conventional forms of resource developments and trade, but also in less conventional forms such as barter and counter-trade as discussed earlier.¹³

Sarkar (1985) has investigated the implications of differential rates of time preference across countries on the pattern of trade in intermediate goods, by allowing trade at every point on the productive spectrum. The testable hypothesis deriving from his model is that those countries for which the cost of capital is relatively high tend to specialize in those processes which require relatively less capital. Hence, less developed countries with lower wage rates but relatively high capital costs specialize in the production and export of intermediate goods on the low end of the productive spectrum. They thus avoid having to "hold the goods in process for the entire productive spectrum." (Sarkar, 1985:86).

Sarkar's economy is characterized by a sector in which each successive stage of production from raw material to final consumer good is an input to a subsequent stage of production. Suppose this sector is the fisheries sector. Suppose, further, that the output of each process requires D&E services, to which it exhibits diminishing marginal productivity. Then, allocation of D&E between a host country and its foreign partners¹⁴ determines the level of tradable production.

With the advent of extended jurisdiction, D&E activity in the waters of coastal nations acquired increased legitimacy in the international community and, thus, the property rights of coastal countries could be strengthened by their use. Production possibilities for those countries increased, as suggested above. Thus, D&E expenditure raises the possibility of greater diversification within the coastal zone and raises productivity there. Productive factors are drawn from other sectors, resulting in production and trade of intermediate goods closer to the final stages of production. On the other hand, countries for which D&E services are costly to produce may become aggressive traders in the more primary focus of fisheries: Fishing access and raw product.¹⁵ This is undoubtedly the case for many of the developing coastal countries.

There has been a growth of independ-

ent third-world states since the beginning of the twentieth century. Between 1943 and 1981, 94 newly independent nations emerged. These new nations are just beginning to make significant impacts in agriculture, light industry, and even heavy industry. Many, however, are extremely poor. Extended jurisdiction undoubtedly gained considerable impetus from the desire to broaden natural resource bases by both these countries and the developed countries. In this milieu, the United States exerted jurisdiction over the resources of the seabed of the continental shelf, then over fisheries resources, and finally declared an EEZ. The United States, through the Magnuson Act, has embarked upon a careful development plan to do away gradually with foreign fishing activity in the EEZ, and to domesticate completely all stages of fishing and processing activities. We believe that consideration of the several issues raised in this and the previous section would greatly enhance future discussions of U.S. fisheries policy.

For example, U.S. fisheries trade involves two major groups (government and the private sector) and several interrelated markets. Two big U.S. markets are the access market and the raw product/JV market. In some dealings, it is unclear what is being traded. The bundle could include trade concessions on unrelated U.S. exports. However, by attempting to assert strong property rights the government may be changing the relevant trading bundle and, thus, the terms of trade. This may cause former guests to go on a search for, and develpment of, fisheries in other nations. If guest fishing nations are able to find low cost of access within developing nations, for reasons described above, then their competitiveness should not be substantially diminished by the U.S. phase-out. On the other hand, U.S. producers, constrained in the purchase and use of foreign hulls and by an expensive ship-building industry, and shut off from ready-made JV markets, may be fighting an uphill battle to stay ahead of the other world fishing powers.

In addition, fisheries management has long enjoyed access to relatively high quality data on catch and effort generated by guest fishing nations. The assertion of stronger property rights will erode this

¹³Banks (1985) argues that these newer methods of trade are becoming popular because "surplus commodities" exist, largely as a result of artificially constrained markets created by government policy. He cites three main sources or rationale for barter activity: Domestic price controls, international price controls, and exchange controls. However, we believe Banks leaves out an important reason for barter and counter-trade. Newly found resource wealth in countries constrained by capital scarcity forces the consideration of nonconventional trade arrangements which, from the standpoint of standard trade practice, make little sense. However, if the notion of strength of rights is incorporated in the problem the basis for these policies is clear. While it may well be that barter and countertrade is a second-best policy for many countries, a number of nations, including firms in the United States, have used these methods to their (apparent) advantage. The existence of barter clauses in joint-venture arrangements between U.S. and foreign entities is somewhat indicative that alternatives to conventional trade, even for some U.S. firms, has been fruitfully used in conjunction with other arrangements.

¹⁴This will, of course, depend on relative input and output prices, as well as the technical relationships among D&E services, intermediate products, and final goods. ¹⁵For noneconomic reasons, investment in D&E

¹⁵For noneconomic reasons, investment in D&E may enter the substitution range of the production possibilities set. This can act as an effective constraint on resource development.

data base, and the rights of data access now will have to be renegotiated with domestic fishermen. This is potentially an important consideration, since a substantial amount of data, and necessary infrastructure for collecting these data, was developed through long association with the guest nations. In a sense, trade took place in scientific information for fisheries managers as well as in access to fisheries. Fisheries managers may well lose part of that component which they previously had by trade associations.

U.S. fishermen may eventually consider the prospect of engaging in multinational operations which take advantage of their skills at harvesting coupled with low costs of entry and efficient processing technologies. This could mean teaming up with a foreign factory ship and guest fishing on productive grounds off the coasts of developing nations. Finally, fisheries development in other countries with an eye towards improving access has long been employed by other nations as a means of taking advantage of opportunities that exist for trade. The U.S. industry may find this option attractive. In other words, EJ could conceivably offer possibilities for fishermen and processors beyond the U.S. EEZ. If U.S. fisheries policy does place the industry at a disadvantage in the world market, then a logical response of the industry might be to draw raw product from cheaper sources. In summary, Americanization, while a popular policy, may have the effect of turning the industry inward and encouraging an air of complacence. It might, however, be auspicious for that industry to continue expanding its world view for opportunities in fisheries production and trade.

To this point we have focused on events within the fisheries sector. In the next section we briefly examine the second thesis of this paper: Namely, that events outside of the fisheries sector are important in understanding seafood trade¹⁶.

Seafood Trade and Macroeconomic Factors

We have argued that analysis of the relationship between seafood trade and extended fisheries jurisdiction may lead to a misunderstanding of underlying economic processes if decisions about the strength of property rights associated with harvesting are not considered explicitly. However, even in the absence of this consideration, there is another difficulty associated with focusing on the impacts of extended jurisdiction on seafood trade: Failure to consider the role of events outside of the fisheries sector.

As indicated above, one could view extended fisheries jurisdiction as a global reallocation of ownership of the ocean's resources. We have suggested that the issue is more complex than this. Even if it weren't, however, there are some characteristics of the fisheries resource that merit special treatment. Consider, first, the relationship between seafood trade and real economic activity.

Seafood Trade and Real Economic Activity

Economists argue that international trade and domestic trade merit different treatments (and models) because factors of production are less mobile among countries than within countries (Caves and Jones, 1973) and because public policies affect trade among countries differently than trade within countries (Lindert and Kindleberger, 1982). But suppose changes occur in the geographical boundaries of the world's nations. The numbers appearing in the international trade data of the world could be dramatically affected by a globally accepted declaration of sovereignty by each of the 50 states of the United States, the 10 provinces of Canada, or the 32 states of Mexico. Shipments of California oranges to Michigan or of British Columbia salmon to Ontario would become international, instead of interregional, transactions. Apparent, as opposed to real, increases in economic activity could thus be generated by a shift in national

boundaries¹⁷. One could argue that such a shift has taken place in the ownership of the world's oceans. It is important to distinguish between resulting changes in the level and nature of real economic activity and a simple relabeling of existing activities¹⁸.

While extended fishery jurisdiction has not yet resulted in massive territorial expansion, the almost universal acceptance of the fishery management authority of coastal states (albeit not without conflict; Jacobson, 1980) effectively redistributes access to the living resources of the world's oceans. Has economic activity increased with extended jurisdiction? Between 1976 and 1982, the volume of seafood traded internationally rose about 27 percent (FAO, 1984)¹⁹. During that same period, the world harvest of fish, crustaceans, and mollusks increased about 7.5 percent (FAO, 1984). Thus, world seafood trade increased considerably more than did world seafood production. It is likely, then, that some of the increased trade represents a redistribution of, rather than a global increase in, economic activity²⁰.

In addition, some of the increased trade activity in seafood may have resulted more from phenomena outside of the fisheries sector, phenomena which were independent of extended fisheries jurisdiction. The analysis by Johnston and Siaway (1985) suggests that increased international seafood trade would have occurred even without extended fisheries jurisdiction, because of changes in global economic conditions. These authors argue further that the effects of this major development in the ownership of

¹⁶The discussion that follows draws heavily on Johnston and Siaway (1985) and on R. S. Johnston (1984), Status and trends in seafood trade. Unpubl. pap. pres. at Eighth Annu. Sem., Cent. Oceans Law Pol., Univ. Va.

¹⁷In the long run and in the presence of perfect markets. Short-run decisions could be affected because of adjustments to the new institutional arrangements. Further, new, administratively determined levels of factor mobility may introduce new constraints on the operation of markets and, hence, affect the levels of real economic activity.

¹⁸When new resource discoveries are made (e.g., oil deposits) in a country, one would, under circumstances favorable to the utilization of those resources, expect an increase in that country's economic activity and, as a result, an increase in worldwide economic activity. It is not clear that such increases would necessarily accompany a redistribution of the existing stock of resources among the various countries of the world.

¹⁹These figures pertain to product weight and to the 158 countries covered by the FAO data. While there are aggregation problems associated with using product weight to measure trade volume, they are probably less severe than those associated with the corresponding value figures. ²⁰Although, because of strengthened property rights overall, global production possibilities may also have increased. See Anderson (1977) and Wilson (1984, footnote 3).

Table 1.-U.S. edible and nonedible seafood exports and imports, in value terms, 1961-85.

		ands of doll	ars	
Year	Exports	Real exports ¹	Imports	Real imports ¹
1961	34,710	50,065	400,619	577,844
1962	35,728	50,599	489,807	693,680
1963	56,605	78,980	500,712	698,635
1964	64,204	88,229	564,243	775,379
1965	69,483	93,441	600,904	808,101
1966	84,813	110,491	719,702	937,600
1967	82,209	103,983	707,883	895,374
1968	67,757	82,090	822,669	996,691
1969	104,533	120,444	844,293	972,800
1970	117,484	128,468	1,037,410	1,134,401
1971	139,245	145,032	1,074,201	1,118,843
1972	157,908	157,908	1,494,411	1,494,411
1973	299,168	282,901	1,583,133	1,497,052
1974	262,132	227,252	1,710,878	1,486,686
1975	304,729	242,252	1,637,099	1,301,454
1976	384,690	290,683	2,328,186	1,759,246
1977	520,496	371,650	2,633,606	1,880,476
1978	905,534	602,004	3,085,951	2,051,556
1979	1,085,816	664,514	3,808,791	2,330,676
1980	1,014,527	568,681	3,648,452	2,045,096
1981	1,178,000	602,249	4,206,011	2,150,312
1982	1,095,285	528,103	4,523,578	2,181,088
1983	1,072,742	498,255	5,129,372	2,382,430
1984	1,027,881	460,108	5,883,393	2,633,569
1985	1,188,434	512,919	6,678,598	2,882,433

Table	2U.S. ex	ports	and	imports	of	agricultural
	commoditi	es, in	value	e terms,	19	61-82.

	Value in billions of dollars					
Year	Total exports	Total imports	Real exports ¹	Real imports ¹		
1961	5.0	3.7	5.3	5.3		
1962	5.0	3.9	7.1	5.5		
1963	5.6	4.0	7.8	5.6		
1964	6.3	4.1	8.7	5.6		
1965	6.2	4.1	8.3	5.5		
1966	6.9	4.5	9.0	5.9		
1967	6.4	4.5	8.1	5.7		
1968	6.3	5.0	7.6	6.1		
1969	6.0	5.0	6.9	5.8		
1970	7.3	5.8	8.0	6.3		
1971	7.7	5.8	8.0	6.0		
1972	9.4	6.5	9.4	6.5		
1973	17.7	8.4	16.7	7.9		
1974	21.9	10.2	19.0	8.9		
1975	21.9	9.3	17.4	7.4		
1976	23.0	11.0	17.4	8.3		
1977	23.6	13.4	16.9	9.6		
1978	29.4	14.8	19.6	9.8		
1979	34.7	16.7	21.2	10.2		
1980	41.2	17.4	23.1	9.7		
1981	43.3	16.8	22.2	8.6		
1982	36.6	15.3	17.6	7.4		
1983	36.1	16.5	16.8	7.7		
1984	37.8	19.3	16.9	8.6		
1985 ²	29.1	19.5	12.6	8.4		

¹Deflated by the GNP deflator, 1972=100 Source: National Marine Fisheries Service, "Fisheries of the

United States, 1961-85."

¹Deflated by GNP deflator, 1972=100

²Estimated values Source: USGPO (1986) and other annual volumes.

Table 3.—U.S. international transactions, merchan dise exports and imports (excluding military) in millions of dollars¹

Year	Exports	"Real" Exports ¹	Imports	"Real" Imports ¹
1961	20,108	29,003	14,537	20,968
1962	20,781	29,431	16,260	23,028
1963	22,272	31,076	17,048	23,787
1964	25,501	35,043	18,700	25,697
1965	26,461	35,585	21,510	28,927
1966	29,310	38,184	25,493	33,211
1967	30,666	38,788	26,866	33,982
1968	33,626	40,739	32,991	39,970
1969	36,414	41,956	35,807	41,257
1970	42,469	46,440	39,866	43,593
1971	43,319	45,119	45,579	47,473
1972	49,381	49,381	55,797	55,797
1973	71,410	67,527	70,499	66,666
1974	98,306	85,424	103,811	90,192
1975	107,088	85,132	98,185	78,048
1976	114,745	86,705	124,228	93,899
1977	120,816	86,266	151,907	108,428
1978	142,054	94,438	176,001	117,022
1979	184,473	112,883	212,009	129,748
1980	224,269	125,711	249,749	139,994
1981	237,085	121,209	265,063	135,513
1982	211,198	101,831	247,642	119,403
1983	201,712	93,689	268,928	124,909
1984	219,916	98,440	334,023	149,518
1985 ²	216,640	93,500	333,375	143,882

¹Deflated by GNP deflator, 1972 = 100. ²Estimated value

Source: USGPO (1986) and other annual volumes

the world's resources were masked because most of the changes in fisheries jurisdiction occurred when overall trading relationships were being realigned.

While EJ may have led to a smaller increase in the world's wealth than suggested by the trade data, redistribution of that wealth has generated both gainers and losers. We turn next to a discussion of international seafood trade by one expected gainer: the United States.

U.S. Seafood Trade and Extended Jurisdiction

With the declaration of the Magnuson Fisheries Conservation and Management Act (MFCMA) of 1976, it would not have been unreasonable to anticipate increased domestic landings and, thus, both less reliance on seafood imports and increased export activity by the United States. In fact, what has happened? The average annual harvest by U.S. commercial fishermen during the 3 years immediately prior to the MFCMA was 5 billion pounds. By 1980-82 this figure had increased to 6.8 billion pounds, an increase of over 30 percent. The dollar value of fishery exports (measured in 1972 dollars) rose from an average of \$251 million to one of \$555 million, an increase of more than 120 percent over the same period²¹. On the import side, the dollar value also rose, from a 1973-75 average of \$1,428 million to a 1980-82 average of \$2,125 million. On a per-capita basis, this represented an increase of 38 percent. Thus, while imports increased over the period, exports increased even more significantly, lending support to the hypothesis that, at least for the United States, extended fisheries jurisdiction led to increased export activity and a substitution of domestically harvested seafoods for imports.

A closer look at the data suggests the need for caution in attributing changes in trade activity to extended jurisdiction, however. Tables 1-3 and Figures 4 and 5 show U.S. imports and exports (in value terms), respectively, of fishery products, agricultural products, and all merchandise for 1961-85. Comparison of these

data reveals some remarkable similarities. On the import side, for example, the

figures in all three categories increased in approximately linear fashion during 1962-71. Exports followed a similar pattern, with the exception of a drop in agricultural exports between 1966 and 1969. In the early 1970's exports of all three classes increased dramatically-and so did imports. Following a brief decline in the mid 1970's, exports of all merchandise and of agricultural products once again increased through the end of that decade. Seafood exports also rose over the period, peaking in 1979. While annual fluctuations should not be ignored, it is interesting to note that, from the late 1960's to the late 1970's all three groups rose exponentially-or, at least, more rapidly than during the early 1960's. During the past 4 or 5 years, there has been a decline in exports for the three groups²². The point of this exercise is to suggest that there do not seem to be significant differences between the exports

²¹These figures include direct sales by U.S. fishermen to foreign processors but exclude deliveries by U.S. fishermen to foreign ports.

²²There were exceptions in 1984 for the nonseafood categories and in 1985 for seafoods.





Figure 4.—U.S. exports of seafoods, agricultural commodities, and all merchandise: Percent of 1972 real values (1972 = 100), based on 3-year moving averages. Source: Tables 1, 2, and 3.

Figure 5.—U.S. imports of seafoods, agricultural commodities, and all merchandise: Percent of 1972 real values (1972 = 100), based on 3-year moving averages. Source: Tables 1, 2, and 3.

of fishery products and the overall export activity of the United States. While seafood exports have increased with the MFCMA, so, also, have exports of agricultural commodities and of all merchandise taken together. Furthermore, the recent decline in seafood exports parallels similar declines in other export sectors of the U.S. economy. It would be difficult to attribute these patterns to extended fishery jurisdiction.

What about imports? Here the situation is similar. Aside from the 1973-76 period, imports of products in all three sectors grew between 1961 and 1979. Since 1979, however, there has been a difference, with seafoods showing a drop between 1979 and 1980, and increases since then. The recovery did not begin until 1983 for agricultural imports and imports of all merchandise. With this exception, the general conclusion is similar to that reached for exports: The seafood sector looks very similar to other sectors of the U.S. economy, as measured by changes in economic activity.

Johnston and Siaway (1985) explored

this issue statistically, using data for 1961-82. Their analysis suggests that, while extended fisheries jurisdiction appears to above played a role in U.S. seafood exports, patterns in both imports and exports have been importantly determined by macroeconomic factors, including exchange rates: The same macroeconomic factors that lie behind U.S. trade patterns in general. This finding is hardly surprising. It is simply a result of the interdependencies between the fisheries sector and the rest of the economy. It is also consistent with a similar finding by McCalla (1982) for U.S. agriculture.

We do not mean to suggest that events within the fisheries sector are unimportant in understanding seafood trade. On the contrary, a number of events, some of them spawned by the Magnuson Act, have played major roles in particular markets for particular species.

In the case of Pacific salmon, for example, legislation of the mid-1970's, strengthened by the Magnuson Act, enabled the United States and Canada to control interception of North American salmon by the Japanese distant-water fleets. This and favorable climatic and oceanographic conditions led to large runs of salmon being made available to the Alaska fleets. Increased availability of salmon in the United States and decreased availability in Japan resulted in increased exports by U.S. supplies to the Japanese market. In addition, the United States has experienced substantial increases in the imports of a related product: Atlantic salmon from Norway. As a farmed product, delivery is possible during those months when U.S. production is low. However, even if there had been no change in demand and supply conditions in the United States and its European markets, one could have anticipated a substitution of Norwegian for U.S. salmon, both domestically and abroad, because of the relative strength of the U.S. dollar against major European currencies, including the Norwegian Krone²³. Other factors are also im-

²³This situation has changed recently.

portant, but the central point here is that both microeconomic and macroeconomic variables are important determinants of market conditions in the seafood sector.

Our point here is that the seafood sector is not immune from changes occurring in the rest of the economy. With extended fisheries jurisdiction came expectations of increased production and expanded exports by the United States. With respect to sales of seafoods, it appears that global economic conditions have played the dominant role. It is important to remember, however, that, as argued in the first part of this paper, new trade patterns in intermediate goods have emerged. These are closely linked to emerging institutional arrangements within the fishery and should be included in any discussion of the trade impacts of extended jurisdiction.

Summary and Conclusions

There are theoretical and empirical bases for stating that the structure of property rights and the associated institutional arrangements are codetermined with both the level of production within a country and the types of goods traded. These rights are based upon a combination of international customary law and the level of defense and enforcement chosen. Extended fisheries jurisdiction can be viewed as leading to shifts of production possibilities schedules, but the issue is much more complex than this. Specifically, because policing the use of newly acquired resources is not costless, coastal countries may choose to participate in trade with other countries that involves bundles of services, including policing services themselves.

Thus it is not likely that the trade environment for the fishery can be completely characterized by looking at the trade statistics for fish. In fact, trade in a number of instruments which lead to the production of fish can be seen in the world today. Some of these trades may never appear in a balance of payments account. For a cash-poor country, with limited access to exploitation technology and with a relatively high cost of capital, the prospect of being able to sell some intermediate good without expensive capital expenditures on investment in defense and enforcement may be attractive indeed. A country may even choose to export fishing rights and to import fish from its own zone if policing services can be provided at relatively low cost by distant-water fleets.

The new fishing zones may provide the economic analyst with a laboratory in which to improve understanding of the trade phenomenon in general. It may no longer be possible for us to think of trade solely in terms of goods and services in any meaningful way, without explicit consideration of trade in factors which strengthen or weaken the property rights in those goods and services. It has long been argued that trade takes place in the rights to goods, not in the goods themselves. We have argued, however, that those rights come in various degrees, leading to different terms of trade for the associated goods and services. This is true for all trade; under open access conditions the property rights dimension is simply more obvious.

Much of the motivation for complete "rationalization" of the EEZ seems to stem mainly from an import/export substitution argument: The U.S. wishes to substitute imports with domestic production and to capture the export markets which ostensibly would be ours if we removed foreign fishing. There may be several drawbacks to such a policy. First, the United States competes on many primary industry markets with developing countries (e.g., grains and some meats), and it is not clear at this point that it competes well in these commodities. It is also unclear where our advantage is in the production of fish for foreign and domestic markets. Although it is clear that our natural resource base is large, production also requires appropriate types of processing technology. The cost of this technology may be relatively high. "Americanization" of the U.S. fishing zone may look different than currently envisioned.

Second, even if the necessary expenditures of investment in D&E are made, and the United States goes wholly domestic, there are many countries that cannot afford to do the same thing. They will be selling product in the form of access, or joint ventures. These types of trade arrangements, if they are numerous, encourage parties with productive inputs to search for cost efficient combinations of labor, capital, and ocean access. In these instances, Americanization of production may place the United States in a competitively disadvantageous position in world markets.

Third, the U.S. government received a number of concessions from foreign participants which aided considerably in the management of the fisheries. On-board observers and in-season monitoring generate relatively accurate data on direct and by-catch tonnages and made the management of many fisheries relatively easy. With Americanization, U.S. fisheries management data bases could well be eroded to the point of being useless, especially if management's case for data needs is not vigorously made. In this national climate of deregulation and low regulatory agency profile, the fishing community may be able to successfully resist the domestic implementation of the data collection programs previously provided by guest nations.

In summary, the United States is perfectly capable of supplying the level of D&E that will insure the complete domestication of the industry. However, whether the domestic industry will ultimately be able to compete on the world market without asking for protectionist measures in the future is uncertain. Americanization with protectionism would amout to an income transfer from consumers to another protected industry.

In the second section we demonstrated the necessity of paying attention to global macroeconomic trends when sectoral policy impacts are being assessed. This is especially true when those trends have to do with relative differences in productivity of countries, which may have an impact upon the value of currency. This and other macroeconomic phenomena have been instrumental in determining trade trends. While extended jurisdiction has not been neutral where international seafood trade is concerned, it is by no means the only driving force.

We believe that the United States will find itself increasingly in direct competition with newer and hungrier nations who will offer attractive terms of access to resource wealth. As control over the natural resource base tightens, the fishing sector will begin to show increasing similarity with the rest of primary industry in the United States, such as agriculture, with all of the attendant drawbacks when it comes time to trade in these goods. As the sector becomes more domestic, other problems will exhibit themselves, not the least of them being the global impacts of occurrences which lie principally outside of the sector. If trade in intermediate goods is principally confined to wholly domestic processes, it is unclear at this time how competitive these processes will be after foreign resource holders and producers adjust their own property rights expectations and develop their own trade policies toward fisheries.

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Interdependencies Among Fisheries Management, Fisheries Trade, and Fisheries Development: Experiences with Extended Jurisdiction. Discussion

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The task given to these authors of describing the interrelationships between fisheries trade, development, and management was enormous. Rather than trying to cover all the interrelationships, they have chosen to focus on two that

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they feel are important: 1) The endogeneity of the level of property rights and the pattern and terms of trade of a nation, and 2) the effect of exogenous factors, particularly global macroeconomic trends, on trade. The bulk of the paper is devoted to the first topic because it requires greater theoretical development and is inherently more complex than the treatment of exogenous factors. Therefore, I will dispose of my comments on the exogenous factors section first, and then address the property rights issue.

The importance of exogenous factors to fisheries trade is demonstrated in a simple, but effective, way. Comparison of trends in fisheries imports and exports are made to the trends in other commodities. Figures 4 and 5 demonstrate the remarkable similarities in these trends, making the case for the influence of macroeconomic factors. However, these same diagrams are also striking in the dissimilarities between fisheries and the other commodities. In particular, for both imports and exports, the sharp increase of the 1970's starts a year earlier and the response is greater than the other commodities.

One of the reasons for the increase in exports, the fortuitous events in the U.S. salmon market, is discussed in the text, but an even more significant event was the increase in king crab exports from \$11.9 million in 1976 to \$29.0 million in