International Tensions in the North Pacific Seafood Industry

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Forty years ago, H. Scott Gordon (1954) published a seminal fisheries economics article warning that perennially low incomes and overfishing were consequences of open-access fisheries management policies. Fish in the sea belonged to no one and thus, everyone. Gordon used a very simple, highly stylized economic model to show that lack of well-defined property rights over ocean fish stocks encourages over capitalization--too many boats chasing too few fish--with fishing seasons compressing into Olympic-style derbies. Gordon's analysis suggested a simple solution: limit access to commercial fisheries primarily by using property rights as a way of rationing scarce fishery resources. But institutional factors--most notably international law--impeded the emergence of property rights solutions. Until the mid to late 1970s, most of the world's fishery resources were found in international waters. Rights-based fishing couldn't evolve until international law formally recognized in 1982 the 200-mile exclusive economic zones (EEZs) as national jurisdictions. At this juncture, the rights-based fishing literature developed a clear theme that has become an unnecessary source of tension between Japan and the United States in North Pacific waters off the coast of Alaska, where more than half of the U.S. fish are harvested.

Clarification of national jurisdiction allowed fisheries economists worldwide to champion the switch from open access to an individual transferable quota (ITQ) system of access limitation. While rights to individual fish could not be defined until they were harvested, private harvest rights could easily be defined as permanent, transferable and exclusive rights to catch a percentage of the total allowable catch. This simple property rights solution would allow market exchange to guide these rights into the hands of the most efficient, most inventive firms. The most efficient harvesters should be able to purchase quota shares from the less efficient, allowing the industry to consolidate in a way that reflects maximum profitability. Theoretically, no one should be made worse off by this industry-sponsored buyout program that is conceived in a Wicksellian tradition.

Unfortunately, the entire ITQ literature is founded on a fallacy of composition. It implicitly presumes only the harvesting sector intervenes between the fish resource and the consumer. This, of course, is patently false for most fisheries; the processing sector typically is as crucial to the utilization of fishery resources as is the harvesting sector. Nevertheless, fishery economists (and limited but growing worldwide applications) have only considered allocating transferable quota shares to harvesters.

A traditional asymmetric allocation of rights to only harvesters misses the obvious. Catching and processing sectors are co-dependent! Any policy that impacts the structure, conduct, and performance of the catching fleet necessarily affects the cost structure of the processing sector. (This, of course, is not true for a vertically integrated catcher-processing/factory trawl fleet.) The same open access property institutions that caused fleet over-capitalization and the race to fish, also fostered over-capitalization in the processing sector which built up to meet the daily throughput requirements of open access fishing derbies. It follows that policies to rid the harvesting sector of redundant capital necessarily affect the processing sector.

The quintessential feature of ITQ fisheries management is that gains from trade require season elongation as the fleet consolidates. Season elongation, given a constant total allowable catch, will cause the rate of throughput to drop below optimal design capacity for all processors. Processors will experience an excess demand for raw fish, causing them to bid up the exvessel fish price, thereby increasing marginal processing costs as they compete for a greater percentage of a constant total allowable catch. Great news if you fish--devastating if you process, particularly in remote western Alaska where capital is, for all practical purposes, nonmalleable.

In essence, an ITQ policy designed around an asymmetric, harvester-only initial allocation is analogous to a "taking." It unintentionally expropriates quasi-rents from the processing sector and gives it to the harvesting sector by forcing raw fish price conces-

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sions on the processors without compensation. While the extent of rent expropriation remains an empirical question, the expropriation mechanism is analytically demonstrable.

It suffices here to illustrate this proposition graphically. I shall, for the sake of pedagogy, assume the individual quotas are nontransferable (IQ rather than ITQ).

Under an IQ management system, fishers no longer have to race to catch a fixed quota share. Let the daily harvest rate for the fleet decrease such that some or all processors receive a reduced daily supply of raw fish resulting in a disequilibrium situation, as depicted in Figure 1 for a representative processor. Wholesale price (P_p) net of raw fish cost adjusted for recovery (αP) no longer equals the nonfish marginal cost of processing as the daily processing throughput rate declines from R_p^* to R_p'. It follows that season elongation causes the processor to initially lose $QR_p^{IQ+}-QR_p^{IQ-}$ amount of daily quasi-rents, where QR^{IQ-} and QR^{IQ+} indicate lost and gained quasi-rents, respectively.

The processor has an incentive to acquire additional quantities of raw fish in order to recapture quasi-rents and attempt to return to the optimal rate of production R_p^* that equates price and marginal cost. Increasing the price paid for raw fish is the mechanism by which the processor attempts to attract an increased daily raw fish supply; the processor can indeed obtain additional fish by offering a raw fish price that exceeds that of the competition. However, other processors face similar incentives, and competitive bidding begins that only serves to reallocate the total daily catch among competing processors. The harvesters have no incentive to alter their optimal rates of harvesting and thus, the fleet harvest rate remains constant as harvesters accrue additional quasi-rents.

Assume that the processing sector's daily throughput rate remains sufficient to at least meet transaction demands through time, and the market price of processed fish product remains stable at P_p. Competitive bidding among processors for raw fish supplies will increase. This, in turn, decreases the spread (P_p - αP) between the wholesale product price and exvessel price adjusted for product recovery, which lowers the processor's target optimal production rate of finished product below R_p^*. Competition among processors for fish supplies will continue until equilibrium is reestablished whereby surviving processors no longer have an incentive to bid up the price of raw fish. The market is in equilibrium when P has been bid up to the point where the sum of the processor's raw fish demands equal the rate of fish delivery by the harvesting fleet.

Figure 2 provides a graphical illustration of a representative surviving processor's potential daily equilibrium position. As raw fish price is bid up such that $P_0 \rightarrow P_1 \rightarrow P_2$, the optimal processing rate declines: $R_p^{*0} \rightarrow R_p^{*1} \rightarrow R_p^{*2}$. Raw fish demanded by competing processors is declining as well. It is possible that a subset of less efficient processors will shut down operations entirely if P_p - αP declines below their minimum nonfish average variable cost. Equilibrium is attained for a surviving processor when the rate of fish deliveries adjusted for recovery, αR_p, is equal to the quantity demanded, αR_p^*.

Processors' daily (QR) and per unit (UQR) quasi-rents are reduced under the IQ system. The representative processor's daily quasi-rents are reduced in Figure 2 from a level of QR_p^o under open-access management to QR_p^{IQ} under the IQ system. Of course, processors driven out of business have had their daily quasi-rents reduced to zero. On a per unit basis, the surviving processors' quasi-rents decline. The representative processor's per unit quasi-rent declines from UQR_p^o under open-access management to UQR_p^{IQ} under the quota system.

There will always be a subset of processors who experience uncompensated losses under the IQ system. This follows from the fact that processors' per unit quasi-rents have been uniformly reduced and the same total quantity of fish will be processed under the IQ system as under open access management. In the event that all processors continue operating at their original (open access) seasonal quantity of fish (albeit at a slower daily rate for a longer period of operation), then each would suffer uncompensated loss of seasonal quasi-rents. If whole season processing levels were redistributed through inter-processor price competition, then the subset of processors who process less total fish under the IQ system necessarily experience uncompensated quasi-rent losses. Of course, this latter set of processors may include those who experience a total loss of quasi-rents due to plant closure. Also, note that even processors who gain market share could lose seasonal quasi-rents to the harvesting sector.

Relaxing the nontransferability assumption so that harvesting rights are fully transferrable under ITQ management merely exaggerates the foregoing conclusions. Catchers will consolidate due to gains from trade, which further elongates the season and thus, further reduces the daily rate of processing. Uncompensated losses will accrue to the less efficient processors forced to exit the industry. The more efficient processors that remain in business will eventually exit if they do not earn at least a normal profit. Expropri-

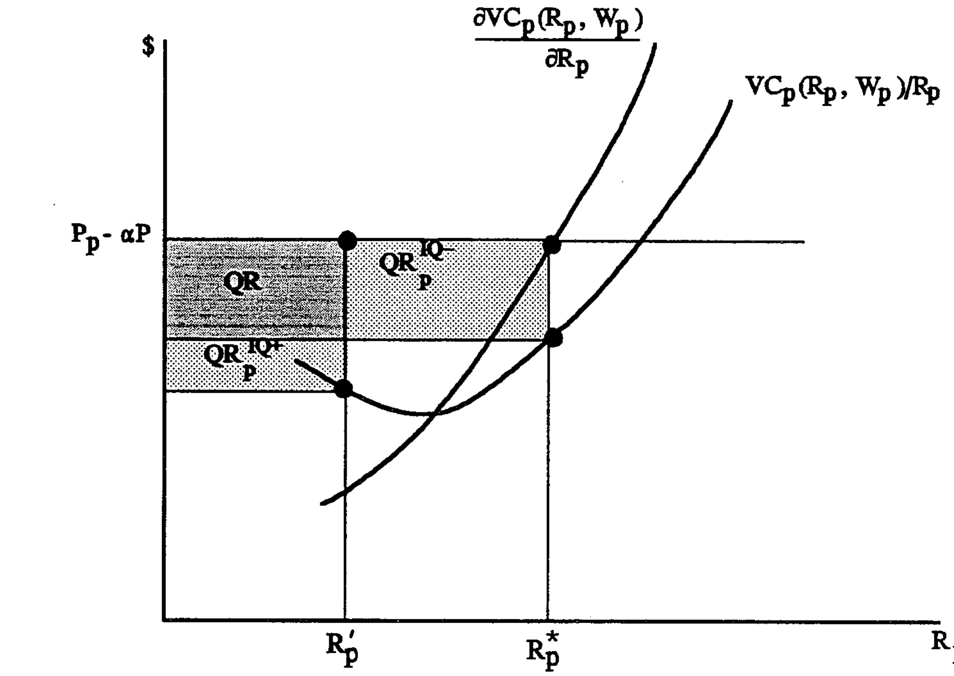

Figure 1. Daily Processor Disequilibrium Under IQ Management

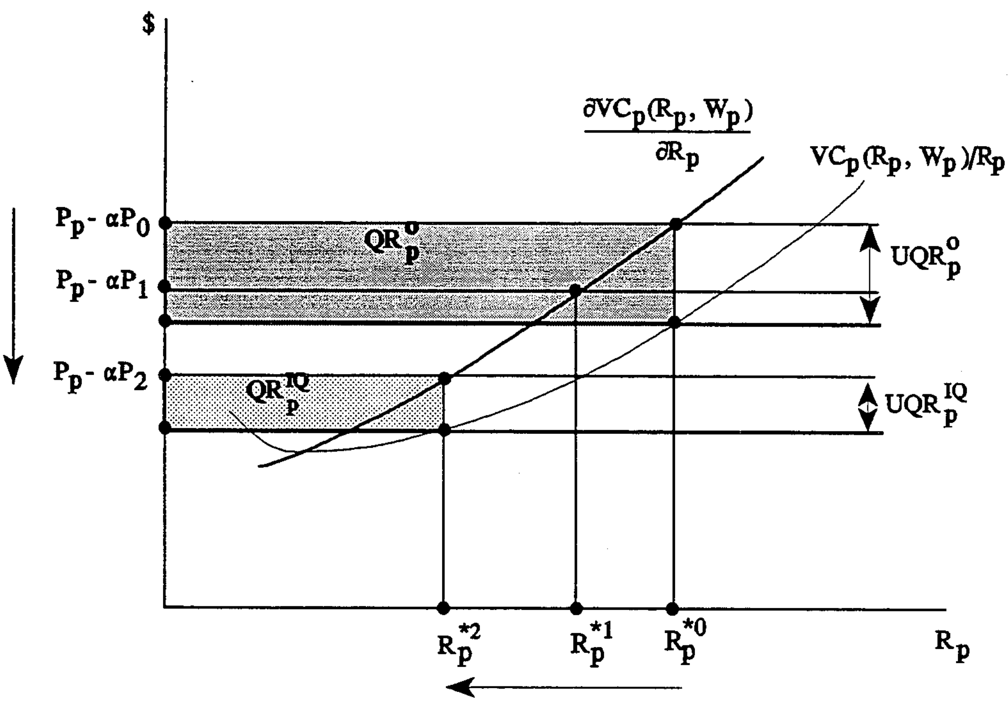

Figure 2. Daily Surviving Processor's Equilibrium

ation of any or all of their status quo quasi-rents is also uncompensated.

So what does this have to do with international tensions in the North Pacific seafood industry? Japan is heavily invested in North Pacific crab and groundfish processing. The five principal on-shore processors collectively account for upwards of a one billion dollar investment in crab and groundfish processing. Four of these five firms are partially or wholly owned by Japanese companies.

Regulatory deprivation of all or partial economically beneficial use of an investment is arguably a "taking" under the Fifth Amendment of the U.S. Constitution, particularly when the deprivation is incidental to the intent of the regulation. ITQ management policy is intended to regulate/manage only fishing activities. Any coincidental frustration of investment-backed economic expectations in the processing sector (e.g., expropriation of processors' quasi-rents) may require compensation. Moreover, on September 7, 1994, the U.S. Department of Commerce, Office of the Chief Counsel for International Commerce issued a legal opinion concerning foreign ownership of quota shares under prospective North Pacific ITQ policy. Citing various bi-lateral treaties with Japan and the GATT agreement, the NOAA opinion argued foreign-owned on-shore processors could not be discriminated against on the grounds of corporate ownership.

Fortunately, there is a simple, albeit controversial, solution to the apparent ITQ dilemma. Redefine property rights so they are symmetrical. One symmetrical initial allocation is to assign harvesting rights to fishers on some historical catch basis and processing rights to processors on an historical processing basis. This "2-pie" initial allocation recognizes the co-dependence of harvesting and processing activities. It promotes the desired gains from quota share trading while assuring all trades are fully compensated. Questions of international and constitutional law become irrelevant. Attention then could turn to other matters that are completely overlooked by academic fisheries economists and industry, alike, who are narrowly focused on ITQ policy implementation.

The inevitable season elongation that will occur because of a shift from open-access management to ITQ management poses new challenges and opportunities for seafood marketing and distribution. For example, season elongation creates opportunities for altering product mix that better take advantage of market niches and associated price differentials. Consider the case of surimi production from groundfish. Short fishing seasons that result from open-access management policies leave little opportunity for surimi processors to produce a broad spectrum of surimi qualities. Instead, their strategy is to produce the highest average quality. A slower-paced ITQ fishery would allow daily production decisions to better reflect market demand for different qualities.

Season elongation will also challenge the entire North Pacific seafood distribution system that currently is geared up for pulse fisheries. Surimi is shipped to Japan by containerized shipping firms, like SeaLand, and also foreign trampers. It would appear that derby-style fisheries, coupled with limited and expensive cold storage facilities in remote western Alaska, provide the scale economies essential to low-cost containerized shipping. How season elongation will reconfigure the distribution system is unclear.

Professional associations, like the Food Distribution Research Society, can help guide the seafood industry toward sensible, if not optimal, reconfiguration. But for this to occur, marketing economists must begin collaborations now with both the seafood industry and with fisheries economists who, in my opinion, are trapped by the myopic focus of their subdiscipline and their zeal to promote rights-based fishing.

Endnotes

1. The main conclusions that follow do not change if instead P_p is assumed to increase with the reduced daily rate of processing. The main difference is the degree to which harvesters accrue additional quasi-rents, which increase further.

2. It is theoretically possible that gains in intra-sector efficiency could increase processing quasi-rents. However, this possibility seems remote. North Pacific groundfish and crab processing firms tend to be technologically similar. Gains in efficiency arising from processing sector consolidation are likely to be small.

3. Surimi is the highly processed fish product that is subsequently reprocessed into finished products like artificial crab. It is the most important groundfish product in the North Pacific.