

Catching Market Efficiencies

QUOTA-BASED FISHERIES MANAGEMENT

When fishermen have access to a guaranteed share of the catch, they have an incentive to focus on the quality, not the quantity, of their catch.

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Too many boats are chasing too few fish, it is said of U.S. fisheries. To address this problem, policymakers must stop treating the symptoms—by restricting gear, seasons, and areas—and focus instead on the incentives fishermen face. Individual fishing quota (IFQ) programs are a promising tool to cut economic and ecological waste in fisheries.

IFQ programs are analogous to other cap-and-trade programs, such as the sulfur dioxide allowance-trading program. They limit fishing operations by setting a total allowable catch, which is then allocated among fishing participants, typically based on historical catch. When fishermen have access to a guaranteed share of the catch, they have an incentive to stop competing to catch as much as possible and start improving the quality of their catch. When shares are transferable, inefficient vessels find it more profitable to sell their quotas than fish them. The result will be fewer and more-efficient vessels.



Worldwide, IFQs are used to manage more than 75 species, including 4 in the United States. Although assessments of these programs are generally positive, their future is unclear. In the United States, a six-year moratorium on implementing new IFQ systems expired in September 2002, but policymakers continue to debate program elements. Legislation introduced in 2001 by Senators Olympia Snowe (R-ME) and John McCain (R-AZ), for example, prohibits the selling and leasing of quota shares (S.637 §2.6.a). Many questions remain, in part because there have been limited opportunities to study the current programs.

The system in New Zealand—the world leader in implementing IFQs—provides a standout opportunity for research. Richard Newell and James Sanchirico of RFF and Suzi Kerr of Motu Economic and Public Policy Research in Wellington, New Zealand, are documenting and measuring the changes in New Zealand fisheries. Here we describe New Zealand's IFQ system and discuss its effects—distributional changes, market efficiency and economic gains, biological health, and political and administrative changes. We then suggest some implications for U.S. fisheries policy.

New Zealand's Quota Management System

In 1986, New Zealand adopted IFQ programs for 26 marine species; the system now includes some 45 species. This system thus provides a wealth of information, covering more than 15 years and a large number of species that are diverse in both economic and ecological dimensions. For example, average life spans range from 1 year for squid to 125-plus years for orange roughy. Some species, such as abalone, occupy inshore tidal areas and are caught using dive gear; others are found offshore in depths over 1,000 meters and require specialized nets and large vessels.

Seafood is New Zealand's fourth-largest source of export income, and more than 90% of fishing industry revenue is derived from exports. As of the mid-1990s, the species managed under the IFQ system accounted for more than 85% of the total commercial catch taken from New Zealand's waters. We estimate that the quota markets have an estimated market capitalization of about NZ\$3 billion, which is approximately equivalent to US\$2 billion.

Under the IFQ system, the New Zealand exclusive economic zone was divided into ten quota management regions for each species based on the locations of major fish populations. Quotas for catching fish were set for each species in each region, creating a number of fishing quota markets. In 2000, the total number of fishing quota markets stood at 275, ranging from 1 for hoki to 11 for abalone. The quota rights can be split and sold in smaller quantities, and any amount

can be leased and subleased. There are limits, however, on the number of quotas that any one company or individual can hold.

The New Zealand Ministry of Fisheries sets an annual total allowable catch for each fish stock. The goal is to have fish populations that can support the largest possible annual catch—the “maximum sustainable yield”—with adjustments to account for environmental, social, and economic factors. Compliance and enforcement are undertaken through detailed reporting procedures that track the flow of fish from a vessel to a licensed fish receiver to export records, along with satellite monitoring and an at-sea surveillance program that includes on-board observers.

Distributional Changes

Throughout the world, the debate about whether to implement market-based approaches in fisheries has concerned their distributional implications—the potential concentration and industrialization of the fishery. Critics of quota management systems argue that such systems will harm small-scale fishermen, a claim analogous to those made for preservation of the family farm. Proponents counter that current management practices are not sustainable, and the survival of any fishing industry—whatever the proportions of small versus large players—is better than nothing. Of course, an IFQ system could be designed to maintain a socially desirable composition of participants—in the Alaskan halibut fishery, for example, there are restrictions on who can trade with whom—but such constraints can reduce the potential efficiency gains.

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In New Zealand, there has been a 37% decline in the number of quota owners, mostly in fisheries that were overfished and had overcapacity problems. Although some small fishing enterprises have exited, many remain. In fact, the typical quota owner holds the minimum required to participate in the fishery. And although about one-quarter of the fishing quota markets are concentrated (as defined in U.S. Department of Justice antitrust regulations), these fisheries were concentrated before the introduction of IFQs. In short, the industry started out with a few big players (vertically integrated catch and food-processing companies) and many small fishing enterprises, and it looks much the same today. The size of holdings of the larger companies, however, has increased.

Market Efficiency and Economic Gains

Whether tradable permits are being applied to fish, pollution, or other resource problems, the ability of firms to buy and sell quotas in a well-functioning market is necessary for achieving efficiency gains.

We find that the New Zealand IFQ markets have been very active, with about 140,000 annual leases and 23,000 sales of quotas as of 2000—an annual average of about 9,300 leases and 1,500 sales. In the typical quota market, the percentage of the total allowable catch that is leased in any given year has risen considerably, from 9% in 1987 to 44% in 2000.

A majority of the transactions between small and medium-sized quota owners are handled through brokers; larger companies typically have quota managers on staff. Brokers advertise quota prices and quantities for sale or lease in trade magazines, newspapers, and on the Internet and charge a brokerage fee of 1% to 3%. Differences in prices paid for the same quota in a given month have fallen, indicating that market participants are learning and these markets are developing.

We also find evidence of economically sensible behavior in the relationship between quota lease and sale prices and fishing input and output prices, quota demand, ecological variability, and market rates of return. Moreover, after controlling for relevant factors, we estimate an increase in the value of quota prices, consistent with an increase in the profitability of the fisheries. Furthermore, as theory would predict, we find larger gains for fish stocks that were initially

overcapitalized and overfished and that faced significant reductions in total allowable catches; in these cases, sale prices rose at an average annual rate of 9% and lease prices, 4%.

Overall, the results suggest that these markets are operating reasonably well, implying that market-based quota systems can be effective instruments for efficient fisheries management.

Health of Fish Populations

IFQ programs can be used to improve the biological health of populations if the cap on total catch is appropriately set.

In New Zealand, evidence indicates that fish populations within the IFQ system are no worse off, in some cases show clear signs of recovery, and in other cases are apparently improving, given current catch levels. For more than half the fish stocks, however, sufficient data to measure changes in fish populations do not exist, and the program is too young for us to assess whether measures taken to improve fish stocks with very long life spans are succeeding.

The IFQ system has spawned some important behavioral changes in the fishing industry that might lead to an improvement in the health of fish populations. For example, New Zealand fishermen have reallocated fishing effort across locations and over the fishing year to minimize the incidental catch of nontarget fish (by-catch) and to avoid

spawning aggregations. Because the system covers so many species, fishermen must reduce by-catch to avoid having to buy additional quotas in the market or pay fees to the government for the fish that are not in their quota portfolios.

Political and Administrative Changes

Proponents of IFQ programs see many political and administrative benefits from allocating shares of the catch to individuals. One way in which the political and administrative fisheries systems have changed in New Zealand is through the formation of quota-owner management companies. These companies invest in value-added research on marketing and processing and work with government scientists to improve data collection and fish stock assessments. As one government scientist told us, “Since the adoption of the IFQ system, things have not always gone smoothly with the industry, but the creation of the management companies has re-

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duced the regulatory transaction costs in setting total allowable catch levels. Overall, there is less animosity between the government and the fishing industry than before the program.”

How fishery management is funded has also changed. New Zealand fishermen now pay annual fees that cover many of the governmental management costs of the program. At the same time, the fishing industry has become more directly involved in these activities.

Implications for U.S. Policy

Our findings are relevant for the ongoing IFQ policy debates in the United States. We can infer from the behavior of the New Zealand fishermen that the flexibility of the system and the ability to transfer shares has high economic value. Furthermore, the option of short-term leases appears to have significant value, as revealed by the dramatic increase in leasing over time. In addition, the opportunity to operate in both sale and lease markets provides an additional dimension across which relevant economic and ecological information can be exchanged and rationalized.

We also find a significant decrease in the number of owners, even as the number of small players has remained high. For overcapitalized fisheries, a reduction in the number of vessels is beneficial. The United States is seeking to reduce capacity by offering fishermen money to retire their vessels, but often the takers are already on their way out, and very little reduction in fishing effort occurs. IFQ programs offer a market-based solution to this overcapacity problem that does not rely on direct payments from the government. The potential sociocultural costs associated with IFQ systems need to be weighed against the benefits of reducing fishing effort, but such concerns can be addressed within an IFQ framework.

The collaborative atmosphere among the stakeholders in New Zealand fisheries management contrasts with the approximately 100 lawsuits currently pending against the U.S. National Marine Fisheries Service (the agency responsible for fishery management). The ability to set fees that recover the cost of management is appealing, especially in this time of budget deficits. This additional revenue could be used to offset the costs of data collection, scientific research, on-board observer programs, and other enforcement programs.

Furthermore, the simultaneous adoption of so many species into the New Zealand system in 1986 provided the industry with incentives to avoid by-catch and improve its stewardship of the marine environment. U.S. policymakers attempting to design single-species IFQ programs that address by-catch might want to consider adopting IFQ systems

for a much wider set of species rather than trying to engineer a solution one fishery at a time.

Finally, we estimate that the total value of New Zealand’s IFQ fisheries, which account for more than 85% of the commercial catch taken in its waters, has more than doubled in real terms from 1990 to 2000, even as fish stocks are improving. Wouldn’t it be great if, 10 years from now, the United States could cite similar statistics? ■

James Sanchirico and Richard Newell are fellows at RFF. Sanchirico’s work centers on the economic analysis of fishery policy design, implementation, and performance, especially the effects of policies such as individual transferable quotas and marine protected areas. Newell’s research interests include the economic analysis of policy design and performance, with a particular interest in technological change and incentive-based policy.



FOR MORE INFORMATION

Individual Fishing Quotas

Richard Newell, James Sanchirico, and Suzi Kerr. 2002. “Fishing Quota Markets.” RFF Discussion Paper 02–20 (www.rff.org/disc_papers/PDF_files/0220.pdf).

Environmental Defense Site on Sustainable Fisheries

(www.environmentaldefense.org/system/templates/page/subissue.cfm?subissue=1)

New Zealand’s Fisheries

New Zealand Ministry of Fisheries (www.fish.govt.nz/)

Motu Economic and Public Policy Institute, Wellington, New Zealand (<http://www.motu.org.nz/>)

Fisheries in General

Pew Oceans Commission (<http://www.pewoceans.org/>)

U.S. National Marine Fisheries Service, NOAA (<http://www.nmfs.noaa.gov/>)