1. Institutional foundations of fisheries management

- Harvest levels in many of the world’s stocks are at or approaching levels that are not sustainable. United Nations Convention on the Law of the Sea effectively foreshadowed rights-based fishing by introducing the notion of a total allowable catch (TAC) based on the concept of avoiding the depletion of fish stocks. A rights based system of management picks up on this concept and combines it with individual transferable quota (ITQ) rights. The combined effect of these two instruments is to achieve sustainability and provide a basis for profitable commercial fishing. The definition of tradable rights is significant because this determines their operational shape and their value.

- New Zealand’s quota management system (QMS) provides two structural pillars. First, harvest levels are constrained by sustainable yield. Second, the shape of property rights underpinning commercial fishing are designed to encourage economic efficiency, innovation and growth.

- The QMS is a world leader in fisheries management. It provides a basis for enterprise that is both profitable and sustainable. Moreover, rights-based management releases a dynamic in which fishing firms continually seek to improve the value of their scarce rights through technical change and innovation. Evidence of these gains is reported in the next section.

- However, New Zealand’s quota management system does not comprehensively address all aspects of harvest viz. the issue of non-commercial access – such as recreational fishing – has not been dealt with.

- The quota management system provided the foundations for the 1992 Treaty of Waitangi (Fisheries Claims) Act, a settlement involving 10% of all existing commercial stocks within quota management system and 20% of any new stocks plus funding to assist Maori into commercial fishing. Today, Maori hold rights to a significant share of the total quota allocated.

References

Sharp, Basil. Fish Quota Management, *Exclusive Economic Zone International*, 3(May/June), 44-45, 2004


2. Productivity and innovation in rights-based fisheries

- Prior to the early 1980s commercial fishing in New Zealand was characterised by low profitability and unsustainable harvest levels. Rock lobster, one of New Zealand’s more commercially valuable fisheries, was no exception. Too many boats were chasing too few fish. Rock lobster were introduced into the QMS in 1990 constraining commercial harvest to a TACC directed towards MSY and, importantly, enabling fishers to trade in the market for quota.
Rights to harvest are a necessary factor of production that fishers combine with labour, capital and other inputs to harvest rock lobster. Because individual fishers can only legally harvest up to their quota they face an ongoing incentive to more effectively utilise their scarce harvesting rights. The productivity gains of rights-based fishing are illustrated using the rock lobster fishery.

- The scope for fishing firms operating in an output controlled fishery, with tradable rights, and facing world prices, to augment profit is limited inter alia to a search for alternative input configurations that lower harvesting costs. We report on two complementary lines of efficiency analysis.

**Time series analysis**

- Industry response to a declining allowable harvest is seen in the percentage of harvesting rights exercised increasing over the 1992-2000 period. Over this period the total lobster fleet has steadily declined. Average output per firm, output per labour unit, and the capital-labour ratio have all increased. Econometric analysis finds the rate of technical change to have steadily increased over the period. The contribution of improving vulnerable biomass to lower harvesting costs is controlled for.

- The relative gains in efficiency that occurred over the nine year period can be attributed to the dynamic unleashed by tradable rights. Under this system of governance the results suggest that fishers do search for more efficient input combinations. The results also highlight the important contribution that tradable rights can make to the economic utilisation of natural resources in general.

- Another innovation is seen in the seasonal shift of fishing effort, timed to coincide with better market prices. Clearly new technologies will continue to offer scope for lowering harvesting costs. Given the harvest constraints facing this industry economic growth in the future will also depend on innovations occurring through organizational design and contracting at various points along the chain of supply to market. Well-defined harvesting rights provide not only a degree of certainty over access to fish stocks they also provide a platform for contracting product supply that matches demand. Historically, seafood companies with an export focus have shown a preference for research and innovation aimed at increasing production and quality of production, rather than developing new product opportunities.

**Cross section analysis**

- Evidence of within-industry efficiency gains is provided by comparing enterprise efficiency in 1993 against that in 2002. A comparison of the efficiency distribution in 1993 with that obtained in 2002 suggests that the mean level of efficiency has increased over the period and the increase is significant. The within-year dispersion of efficiency has reduced. These results support the efficiency enhancing incentives associated with rights-based fishing.
References

Sharp, Basil and Chris Batstone, Factor use and Productivity Change in Rights Based Fisheries, Proceedings of the International Conference in Honour of Professor Gordon Munro, Peter Wall Institute for Advanced Studies, The University of British Columbia, 5-6 August 2004, P15.


3. General Conclusions

The following conclusions are based on our results to date.

1. The QMS has provided both a platform and a mechanism that has facilitated a continuous increase in technical change over the period; improvements in the vulnerable biomass have contributed to productivity gains.

2. The New Zealand fishing industry receives no subsidies, contributes to the cost of management, compliance and research. The absence of government subsidy and limited devolution has clearly unleashed a dynamic that has achieved economic growth within the constraints of sustainability.

3. There is evidence supporting the notion that process and product innovations are complementary. Product innovation is seen in the evidence that rights to harvest are being exercised during months when market prices are highest. Process innovation is most evident in the steady reductions in costs over the period.