

Book Review

Bioeconomic Analysis of Fisheries, Rognvaldur Hannesson. Fishing News Books, February 1993. pp. 138. ISBN#0-85238-198-0

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The author of this book seeks to find an audience with both fisheries economists and fisheries biologists, as well as fisheries managers. I believe he will. The book is set in a traditional economic framework, and as such the author is concerned about maximizing net economic benefits from fisheries over time. Economic efficiency is his prime concern. Nevertheless, Hannesson does sound a warning about the unfettered application of fisheries economics, and free markets, to the fishing industry, a warning that many who have watched the development of fisheries economics over many years will find refreshing. I hasten to add, however, that Hannesson does not push this warning very far.

The first chapter is a basic introduction to market economics. This is presented completely verbally, is concisely written, and I believe is very helpful to the non-economist. The argument is that under some conditions a competitive market will produce the best result. Under other conditions the market fails to do this. What makes Hannesson's approach different from other texts is that he spells out the conditions under which the market is thought to behave well. At least he spells out many of those conditions, and more than most.

Many fisheries economists write as if they believe that somehow, or somewhere, economists have shown that freeing up, or tinkering with the market will improve social welfare. Economists may have shown that under some theoretical circumstances the market may be made to produce the best result, provided we make a number of other assertions about the nature of mankind. Economists have not shown that freeing up of the market will improve welfare at all times, and in all places. It is not very clear how far Hannesson wishes to proceed down this path; but from the point of view of at least one fisheries economist in Australia, where economic rationalism, in fisheries management circles, is viewed as something akin to God, any step down this path is welcome.

Hannesson writes of the competitive market in the following way: 'Each agent is supposed to act in his or her best interest, a behaviour that for analytical purposes can be formalized as maximization of the utility one derives from one's endeavours. Producers are supposed to maximize profits because this gives them the greatest command over resources. Consumers dispose of their given budgets (including time) in a way that gives them the benefit, which for a politician is likely to mean maximizing the likelihood of being elected, and for the civil servant, maximizing career opportunities. The public will be well served by the endeav-

ours of regulators to the extent they happen to promote the public interest simultaneously with their own.' There are no markets like this benchmark one, and it is to Hannesson's great credit that he provides this description.

Chapter two provides the economic theory of fisheries. Hannesson begins from the concept of surplus growth and develops the standard surplus yield model. He first develops the argument for the static case, but does remind the reader of the possibility of depensation, and collapse of fisheries. He then proceeds to discuss free-access to fisheries and why such fisheries are overexploited. He departs slightly from the traditional explanation by allowing for rents to be earned by those owners of capital or labour who possess superior skills or technology.

Moving to the dynamic case, Hannesson emphasizes the role of the rate of interest: optimal exploitation requires the rate of growth of the stock to equal the rate of interest. Hannesson notes that from this 'narrow' perspective it may be optimal to exploit a slow growing stock to extinction. This possibility was noted many years ago in the case of whaling. Nevertheless, it is worth emphasizing that economic forces may well be working towards the extinction of some species; and this implies that those with broader objectives than economic efficiency must be all the more vigilant.

There is also, in this chapter, a brief introduction to the problems associated with fluctuations in fish stocks, the author pointing out that in years when the stock is abundant greater investments may be required. However, Hannesson keeps his explanations simple here in order to return to this problem in chapter four. The remainder of this chapter is used to explore the dynamics of exploited fish stocks and the conditions that lead to stability or extinction. Again he continues to emphasize that economic optimization does not ensure preservation of the stock.

Chapter three is entitled Applied Fisheries Models. In fact it deals with three biological models. But Hannesson presents them in his own style. The Schaefer model is considered first. Hannesson spends considerable space analyzing the implications of discounting (in the absence of discounted fishing costs) on the optimal stock. Hannesson makes the point that rising unit costs tend to protect the stock, as stocks become depleted. Indeed, very few, if any, fish stocks have been hunted to extinction. However, he does *not* point out that it is the joint exploitation of stocks that provides the greatest threat; the exploitation of a valuable stock that is hunted jointly with a less valuable, but slowly growing one, may threaten the conservation of the slow growing stock. But this is only a minor point in a chapter which is about single species, biological models. Hannesson, writing about temperate water fisheries, is not so concerned about multi-species fisheries.

Hannesson next turns to the Ricker model. This model is a discrete model that is most appropriate when there are separate spawning areas, and migratory adults returning to these spawning grounds. In this model fishing and biological growth can be treated as if they occurred sequentially and not simultaneously. Again Hannesson imposes his own style of explanation. Through a number of stylized examples, illustrates that such a model may lead to fluctuations in catch. He further shows that the introduction of the discount rate into a Ricker type model can increase the (economic) optimum level of effort above the Maximum Sustainable Yield level.

Finally, in this third chapter Hannesson examines the Beverton-Holt model,

with multiple year classes. Again he has a similar objective: that is to show that a positive rate of interest leads to a higher rate of exploitation.

Chapter 4 deals with fluctuations in stocks. Hannesson first asks the question whether it is desirable to stabilize catch. Using a Beverton-Holt yield model he compares two strategies: a constant fishing mortality strategy and a constant catch strategy. For the version of the model he examines, neither is unambiguously better on economic grounds. That is, if our objective is to maximize net present value of the catch, we cannot make any a priori judgment. Neither does a practical example, the Arcto-Norwegian cod fishery, resolve the issue, although the statistical methods Hannesson uses would be helpful in particular cases. As in the previous chapter, the real usefulness of this chapter is the exposition of the types of bioeconomic models available, and the way they can be adapted.

The second question Hannesson poses is concerned with optimal investment capacity in harvesting and processing, in the face of large fluctuations in catch. Again he develops the necessary models to handle this problem, but this time applying them to the Barent Sea Capelin. Again the interest is in the method rather than the results. Hannesson maintains his penchant for examining dynamic, stochastic models assuming, as always, that the objective is to maximize net present value of the catch.

Chapter Five, *Methods of Fisheries Management*, brings us back to the problem from which Hannesson started: the tendency of fish stocks to be overexploited. If Hannesson was ambivalent in the first chapter about the appropriateness of economic (market) models, it shows in the solutions he formulates, and his exposition of those solutions. In Chapter One he explained the reason for market failure as follows: 'One such reason, which is particularly relevant to the fishing industry, is the absence of ownership of scarce resources; or what amounts to the same thing is that the scarce resources can be used without any cost as if they were unlimited.' Very few economists familiar with basic economics could disagree. However, by stating the problem in this narrow way, the solution is simultaneously defined also in a very narrow way: either introduce ownership or introduce resource pricing. However, if the problem is stated as Michael Graham did in 1943, 'Fisheries that are unlimited become unprofitable', then limiting the entry will restore profitability. But in this latter case, the way is open for a far greater range of possible subsets of regulations to be tried and tested. Now economists would quarrel with Michael Graham, but biologists and sociologists may not.

The difficulty here is that Hannesson has set his sights on biologists and managers as well as economists, and as he says himself, it is a risky undertaking. 'Its like aiming at two sitting ducks at the same time; most likely you will miss both.' Hannesson knows that it is fashionable to support property rights, or Individual Transferable Quotas in the fishery economists' jargon. He knows that by stating the problem in a certain way he has to get the 'correct solution.' And he does proceed to spend some time expounding the benefits of transferable quotas in terms of economic efficiency. But this reviewer would like to think that he is enough of a rebel to question this headlong rush deeper into the market system for fisheries. However, Hannesson does give his last word, and his last sentence, to license limitation: 'Like catch quotas, boat licenses can [also] be leased or sold for the purpose of getting a share of resource rent.'

Much of Hannesson's book is about his own research and his exploration in

fisheries modelling. He likes dynamic, stochastic modelling, and he shows well the role the interest rate (or the social rate of time preference) must play if net present value (or economic efficiency) is to be pursued in fisheries management. However, he goes much further. He sounds the warning bells that economic efficiency may not be the major objective in all cases. This reviewer would like him to go still further and question the role of the market as a panacea, for all fisheries problems, in all cultures, at all times (he and other economists may not have this wish). Despite this one reviewer's desire, I hope this book is bought and read as Hannesson intended. It's good in theory and in practice.

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