PhD project:

Strategic Management of Shared Fish Stocks Applied to the Pelagic Complex in the North East Atlantic Ocean

PhD student: Hans Ellefsen
Email: ellefsen@sam.sdu.dk
Phone: +45 6550 1091
Addr. Niels Bohrs Vej 9, DK-6700 Esbjerg, Denmark

Supervisor: Professor Lone Grønbæk Kronbak,
Department of Environmental and Business Economics, University of Southern Denmark

Introduction

With the introduction of the EEZs (exclusive economic zones) of fisheries inside 200 miles in the late seventies, it was believed that as 90 % of the fisheries now were in the hands of the coastal states this would not lead to conflicts between the coastal states and to no depletion of the fish stocks. This was far from the truth. Firstly the fish stocks that were migrating through more than one EEZ and the high seas became an area of conflict between the fisheries nations (also called Fish Wars). Secondly the remaining high seas became a place for the fisheries nations not having enough fisheries resources in their EEZs to fish unregulated.

To address some of these issues the parties of UN in 1982 signed the agreement 'Law of the sea' (UNCLOS). As the agreement was put into work it became apparent that the management for the shared fish stocks was not acceptable. Then in 1995 the UN made another agreement, to supplement and strengthen the UNCLOS, and this agreement was called 'Fish stocks agreement' (UNFSA). This agreement introduced the 'regional fisheries management organization' (RFMO) regime in which the relevant coastal states would become members and this organization would also have the management of the high seas in their area. An example of a RFMO is the NEAFC (North East Atlantic Fisheries Commission) that manages the North Eastern Atlantic ocean. A RFMO typically consist of the coastal states and some Distant Water Fishing Nations (DWFN) that do not have coastal state status, but typically have a history of fishing the species.

Even though the RFMO regime has come a long way in solving the problems of the shared fish stocks there are still a lot of problems that are not solved as of yet. In particular the problem of when coastal state members finally agree on how to manage and share the fish stock, what is then the likelihood of stability over time of the agreements made between the coastal states? In the light of climate change and changing migration pattern of fish stocks the stability over time can be a big problem. This has already been seen many times in the NEAFC area and this will be a problem of the future. This issue has not yet been fully solved in the fisheries economics game theory literature, and hopefully this PhD will come up with some solutions to the problems here.

Objective

This PhD project will answer the following research question: *What solution methods can be used to strengthen the stability over time of the agreements on straddling fish stocks? These solution methods will be applied to the pelagic complex North East Atlantic Ocean.*

To be more specific the following hypotheses can be raised:

(1) *When a straddling fish stock migration changes and appears in the EEZ of a non-member of the existing agreement. Should this new 'entrant' become part of the agreement (when)? If yes, with how large a share?*
(2) *Can you make dynamic sharing rules to counter act changing migration patterns of fish stocks?*
(3) *Can you make a multi species sharing model for more stability using the quotas for the species as side-payments?*

Theories and methods

As can been seen from above we are dealing with strategic interaction between agents. To address these issues in economics the appropriate approach is the toolbox of to use Game theory. For analyzing these issues we need both the theory of cooperative games and when there are more than two players we also need to use coalition theory and also non-cooperative game theory.

Also there is a need to collect data and to build bioeconomic models of the fisheries. This part of the project has started as data is collected for most of the nations around the North East Atlantic Ocean as part of another project. In this other project there has also been build models of these data. Finally there is a need to build game theory models of these data.

The project started in March 2010 and lasts to March 2013.

About my self

I am from the Faroe Islands. I have a master's degree in economics and mathematics from Copenhagen University from 1998. Since then I have worked in different jobs in the Faroe Islands. I have also worked as an economist at the Marine Research Institute of the Faroe Islands.