HOW TO SHARE FISH RESOURCES
LARS RAVN-JONSEN
THE CASE OF THE NORTH ATLANTIC MACKEREL

GAME THEORETIC ANALYSIS

TWO EXPLANATIONS:
- Temporary Change: Because the stock is above 3.5 ton
- Permanent Change: e.g Climate Change

Game setting:
- Incumbent: Russia, Faroe Islands, Norway and EU
- Entrant: Iceland

Total rents (billion NOK) in the cooperative solution and Nash equilibrium.

Panel A shows the outcome as total rents in billion NOK. In the panel A the left-hand box shows cooperative management and the right-hand box show the Nash game. The panel B shows the same numbers with the Nash solution stacked on top of the cooperative solution for each of the countries. The thick is the excess benefit of cooperation to be shared between parties during negotiation.

Different perception on ecology gives different expectation for outcome of sharing. Agreement is not possible.

SOCIAL INSTITUTIONS

Management of the marine ecosystem is based on social institutions.
- UN Law of the Sea Convention 1982
- UN Fish Stocks Agreement 1995
- EU Common Fishery (Relative Stability)
- The North East Atlantic Fisheries Commission

These institutions either set the frames for negotiations or set the rules for sharing the resource.

The sharing is always based on population view (stock), implicitly assume a structure of the ecosystem, and often consider the structure fixed in time.

CONCLUSION

Uncertainty regarding the migration pattern of the fish can lead to the breakdown of an international fishery agreement.

The standard fishery agreements, like the one for the Northeast Atlantic mackerel, will normally be based on a fixed sharing rule of, for instance, a total allowable catch set by the ICES. A static split of total allowable catch can make sense if the spatial distribution of the fish is static. The fixed sharing rule therefore implicitly assumes that the ecology of the fish population is static.

Contrary to this we see the ecosystem be populated by a dynamic community of fish populations. The dynamic of this community with respect to both population dynamics and migration pattern is unpredictable on the medium and the long-term terms.

We find it inappropriate to base international agreements on a property that is highly variable since this involves the implicit assumption that it is fixed. Alternatively, our suggestion must be to form the agreements on other properties that are more stable. Therefore, we advocate research that attempts to propose the properties of the marine ecosystems that are stable enough to form the basis for sharing rules for long-lasting international agreements.

INTERNATIONAL AGREEMENTS

2005 NEAPC: 5% Russia, 5% Faroe, 90% Norway + EU = 50/50 split
2005 Iceland invited for negotiations
2010 Faroe Islands leaves the agreement
2013 Greenland enters the fishery
2014 New agreement: Russia, Faroe Islands, Norway and EU. Iceland (and Greenland) still not in the agreement.