

An Experimental Approach to the Influence of Tipping Points and Scientific Uncertainties in the Success of International Fisheries Management

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Abstract : The Atlantic and Mediterranean bluefin tuna fishery have been considered as the archetype of an overfished and mismanaged fishery. This crisis has demonstrated the role of public awareness and the importance of the interactions between science and management about scientific uncertainties. This work aims at investigating the policy making process associated with a regional fisheries management organization. We propose a contextualized computer-based experimental approach, in order to explore the effects of key factors on the cooperation process in a complex straddling stock management setting. Namely, we analyze the effects of the introduction of a socio-economic tipping point and the uncertainty surrounding the estimation of the resource level. Our approach is based on a Gordon-Schaefer bio-economic model which explicitly represents the decision making process. Each participant plays the role of a stakeholder of ICCAT and represents a coalition of fishing nations involved in the fishery and decide unilaterally a harvest policy for the coming year. The context of the experiment induces the incentives for exploitation and collaboration to achieve common sustainable harvest plans at the Atlantic bluefin tuna stock scale. Our rigorous framework allows testing how stakeholders who plan the exploitation of a fish stock (a common pool resource) respond to two kinds of effects: i) the inclusion of a drastic shift in the management constraints (beyond a socio-economic tipping point) and ii) an increasing uncertainty in the scientific estimation of the resource level.

Keywords : economic experiment, fisheries management, game theory, policy making, Atlantic Bluefin tuna

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