

Potential Benefits of a Transboundary Marine Protected Area in Non-Cooperative Scenarios

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July, 2014

Introduction

According to the FAO, shared fisheries could be:

- 1 Stocks that cross one or more EEZs (Transboundary fishery)
- 2 Stocks that distribute over EEZs and international waters
- 3 Stocks fished exclusively in international waters
- 4 Highly migratory species

Problems

Generally speaking, there are three main factors that make the management of shared stocks a difficult task:

- 1 Lack of property rights
- 2 Movement over several or no jurisdictions
- 3 Fishing externality

Incentives

These three factors altogether will induce the following rationale:

- *"What I don't fish today, will be fished by others tomorrow"*
- *"All the others' fishing is affecting my own availability of fish"*
- *"The benefits of my catch are only mine"*
- *"Whatever I'm fishing is not enough to affect the resource"*
- *"If no one owns the resource, I own the resource"*

The combination of these incentives will induce over-fishing in the long-term.

Solutions

- Pretty often, some sort of fishing agreement is suggested to deal with these problems
- Co-management and cooperation are the most common
- These agreements can often be perceived as unfair or hard to implement

Are there any other alternatives?

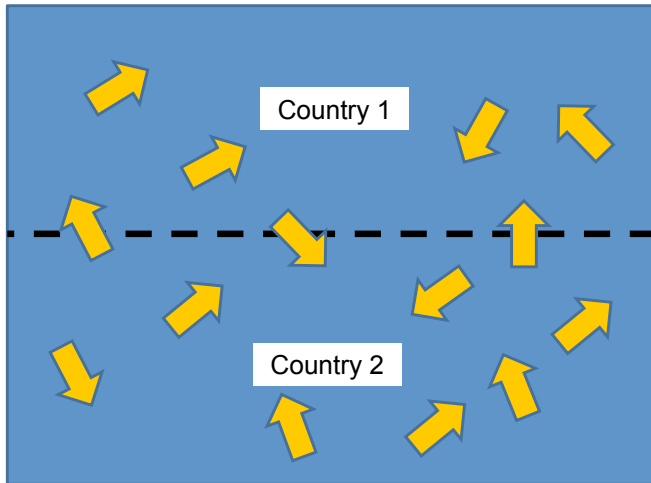
Model overview

We can try to answer this question by having a model that considers:

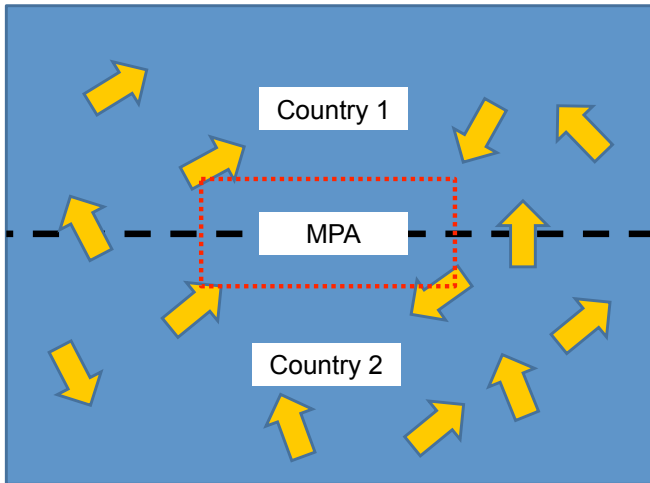
- Spatially distributed stock
- Movement over space
- Strategic interaction between agents

Can we use a Marine Protected Area (MPA) to manage a fishery?

Transboundary fishery



Transboundary MPA

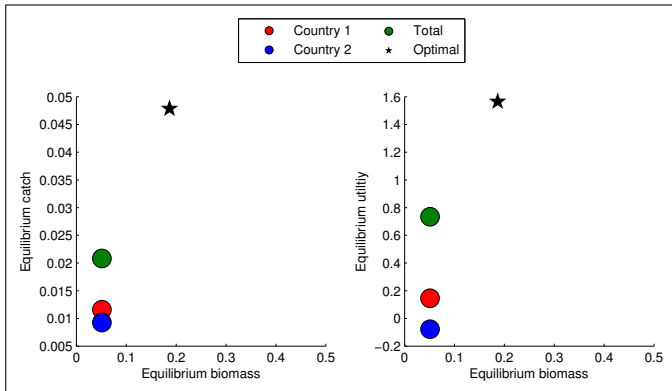


Model framework

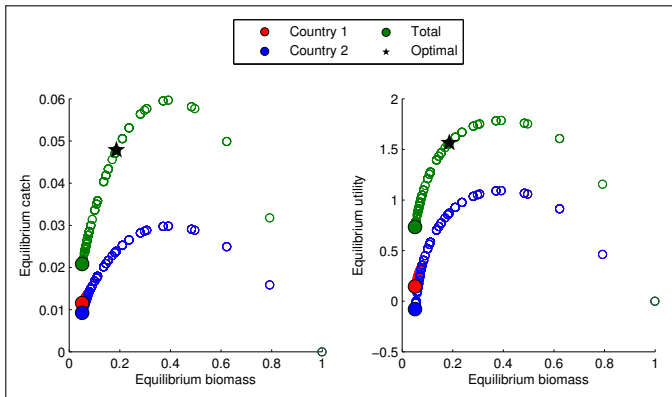
We expanded the seminal model for transboundary fisheries proposed by Levhari and Mirman (1980), and included:

- Two agents: an aggressive and a conservative country
- Countries agree on declaring an MPA but behave non-cooperatively
- All possible combinations of an MPA equally shared by both countries
- Different movement patterns (as a function of distance) over space

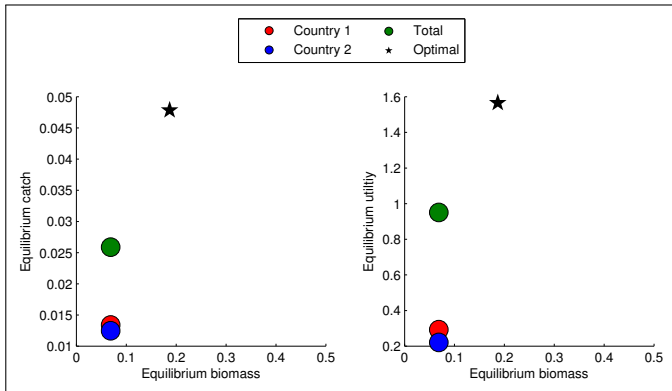
Status Quo - High Movement



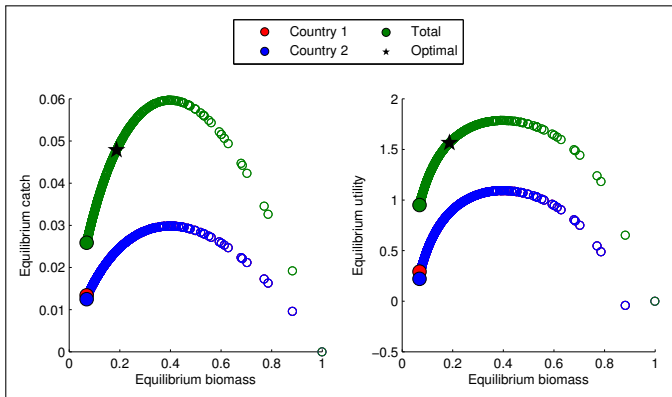
Trade Off - High Movement



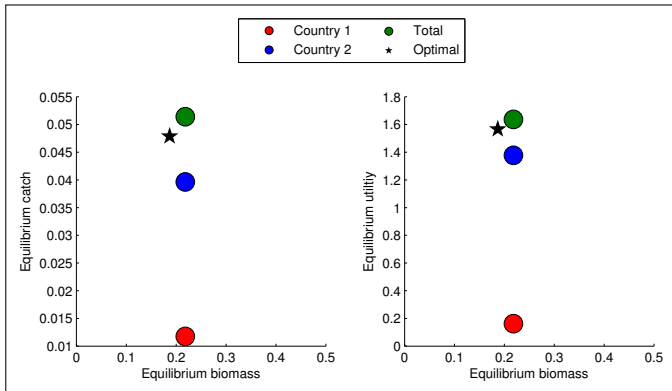
Status Quo - Medium Movement



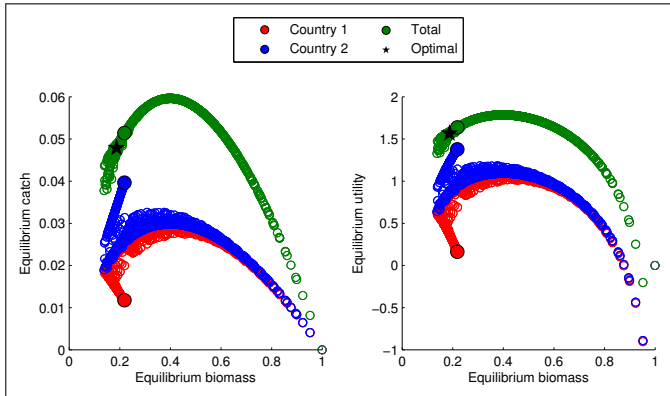
Trade Off - Medium Movement



Status Quo - Low Movement



Trade Off - Low Movement



Implications of an MPA

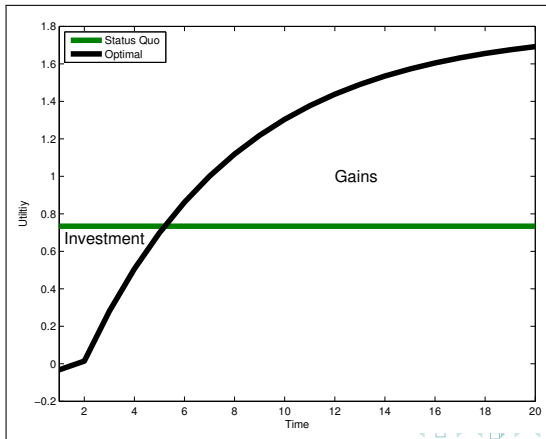
Despite having benefits in some scenarios, protecting a fraction of space in a fishery could have several implications:

- Effort mobilization
- Decrease of harvest levels in the short-term
- Economic losses in the short-term
- Stake-holder opposition

(However, fishing agreements are not exempt from the same consequences)

Investment and Gains

Using the MPA with the highest total long-term utility for the high movement example:



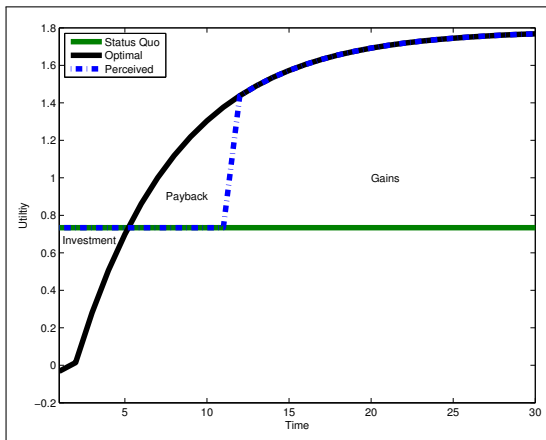
Financing mechanisms

We propose three financing mechanisms that can make agents indifferent to the implementation of an MPA

- Continued Status Quo
- Fixed payment
- Share of gains

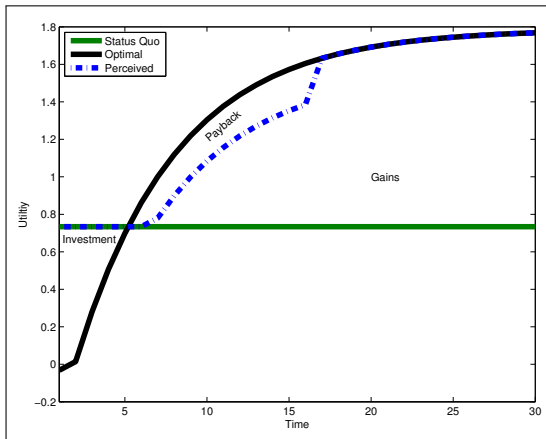
Status Quo

All gains over the Status Quo are destined to cover the investment



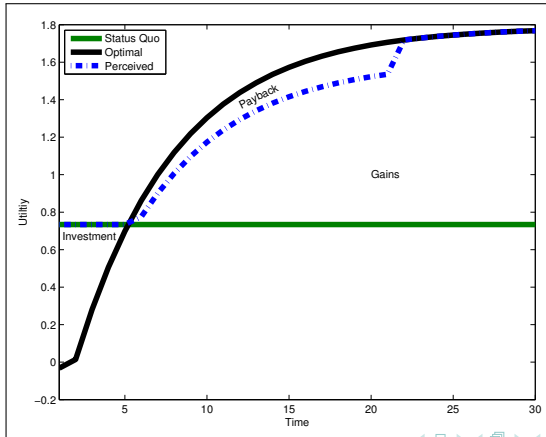
Fixed Payment

Fixed payment as a function of the investment amount



Share of Gains

A fixed share of the gains over the Status Quo is destined to cover the investment



Transboundary MPA

- The problem of shared stocks is real and needs to be solved
- Common solutions require strong institutions and willingness to cooperate
- Non-usual approaches such as MPAs could be used when these institutions are not in place or too expensive to implement
- MPAs could be used to correct non-cooperative scenarios under proper conditions and design

Financing the MPA

- To decrease stake-holder opposition, short term negative effects need to be diminished
- Financing mechanisms could be used to induce indifference in the system and ease implementation of MPAs and/or other type of fishery reforms
- MPAs and other reforms make complete economic sense as long as gains exist in the system
- It is necessary then, to explore and create instances for the discussion of implementing MPAs and other management strategies for shared stocks' management

Thank you!