

Sunk costs equal sunk boats? The effect of entry costs in a transboundary sequential fishery.

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Abstract: Climate change is likely to result in the uncertain relocation of fish stocks. As a result new countries will emerge that compete for the resource. Although several authors have investigated this issue, most authors assume that entry is free. Although true for some fisheries, this ignores the fact that for other fisheries substantial sunk investments are needed. In addition authors that do consider sunk investment costs model them in a deterministic setting. However, the presence of uncertainty in combination with flexibility as to when to incur sunk costs gives rise to an option value, that is, it may pay to wait until the uncertainty is resolved. As climate change and stock shifts are inherently uncertain phenomena the option value may be considerable and play an important role in the decision when, if ever, to enter the fishery.

In this paper I address these important omissions from the literature. I investigate the effects of sunk entry costs in sequential fisheries game in discrete time. The reason I opt for discrete time and a sequential game is that it brings out the issue of timing more clearly and it simplifies some of the outcomes. I model the uncertainty as a shock to the stock dependent fishing costs, in a two player game. The game consists of two time periods and enters steady state afterwards. In each period country 1 fishes first, and country 2 can decide to enter by paying the sunk entry costs once and fish on the stock left over by country 1. Between period one and two a random move decides the subsequent fishing costs for country 1 and 2. The move raises the fishing costs in one country and diminishes them in the other.

I find that allowing for sunk entry costs enriches the game in terms of possible outcomes compared to free entry. The above mentioned option value is present in some cases where it pays to wait, but for other parameter settings it is destroyed by competitive pressure. Depending on parameters, sunk costs can i) result in more aggressive harvesting by the incumbent country compared to harvesting by this country when entry is free, ii) act as a deterrence mechanism that allows the incumbent to deter entry over a larger range compared to when entry is free and iii) act as a commitment device allowing the entrant to commit itself to future fishing, and preventing entry deterrence in a later stage of the game. Given these possible outcomes I conclude that entry costs can play a crucial role, and should not be ignored if they are thought to be present.