

Fisheries Management under Uncertainty using a Hybrid Instrument

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Abstract:

The best harvest control rule (HMR) under ecological and economic uncertainty would be the one which is optimal ex-post. That might be a rule where realized catches adapt to current fish abundance so that total harvest is higher (lower) than expected if ex-ante stock assessments are under (over) estimated. We find that this rule can be achieved by the proposed hybrid instrument. Hybrid instruments have shown to be central in studies with static models but have hardly ever been explored in a dynamic fishery context. In this context each skipper is permitted to exceed the quantity specified by his quota holding. If he do, however, the skipper is penalized by a lower price on his landings compared to the market price he obtains when catching the exact quota amount. On the other hand, if the skipper ends up with catches less than the specified quota, he gets a reward manifested as a higher price on the fish he has landed through the regulation period. The penalty for exceeding the quota by a certain amount is higher than the reward received for being below the quota by the same quantity. If the fishery authority employs a market with a fixed supply of quotas, competitive behaviour will ensure an ex-post equilibrium where fishers acquire optimal amounts of quota holdings. Hence, the scheme may potentially be as easy to implement as an individual transferable quota (ITQ) scheme. The inbuilt quota flexibility facilitates the fisher's ability to balance catches and quotas in mixed-species fisheries.

Keywords:

Asymmetric information; Uncertainty; Harvest control rule; Hybrid instruments; Individual transferable quota; Dynamic optimization

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