Abstract:

We apply and extend the concept of the value of information to a classical optimal arvesting problem when the renewable resource is threatened by a sudden collapse. The decision maker faces twofold uncertainty: the time of a collapse is stochastic, and the hazard rate of a shock, which determines the survival time of the resource, is unknown. While the former cannot be learnt, the latter can be if sufficient investments are made. If the hazard is unknown, the intertemporal decision problem becomes substantially more involved, as the decision maker has to decide on information acquisition to get more information on the hazard rate before deciding on optimal harvesting. We show that irrespective of the information acquired, the optimal harvesting path is given by the most rapid approach path (MRAP) followed by a singular solution. To assess the impact of information on the harvesting problem, we apply the concept of the value of information, which gives the expected increase in the maximised objective function if, once the information is acquired, the optimal policy path is adjusted accordingly. Since the problem is not autonomous, the steady state path and the singular solution may shift over time. We show that information acquisition may substantially increase the optimal objective value, and to what extent this increase depends on the model parameters. Only in the case of perfect information, i.e., when information acquisition unveils the actual hazard rate, an analytic solution can be found; in all other cases, numerical methods have to be applied.