Stackelberg leadership in a productive asset oligopoly

Paola Labrecciosa

Monash University

Abstract: We study a differential oligopoly game where m Stackelberg leaders and n-m Stackelberg followers are engaged in the exploitation of a common-pool renewable resource over time $t \in [0, \infty)$. At each t, firms sell their harvest in the marketplace at a price that depends on total harvest. The objective functional for each firm is given by the discounted sum of profits. The n-m followers play à la Cournot, taking the aggregate of all other followers' output and the m leaders' output as given. The leaders use the followers' best-response functions, but each leader plays à la Cournot against each other leader, realizing that all leaders understand this and are also choosing output in a similar manner. This general model nests Cournot as a special case: we have Cournot competition when m=0 or m=n; m=1 corresponds to the standard Stackelberg model. We derive a multiple-leader feedback Stackelberg equilibrium and proceed with a comparative dynamics analysis w.r.t. various parameters of interest. We also compare and contrast the multiple-leader feedback Stackelberg equilibrium with the Cournot equilibrium and obtain a number of novel results on the relative efficiency of the two equilibria.