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A dynamic game with feedback strategies for internalizing externalities

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Abstract
In this paper we consider a dynamic nonzero-sum game between the polluting firms and the authorities. Although the proposed game is not easily solvable for the feedback case, i.e., it is not the linear quadratic case of game neither the degenerated game case, we calculate explicitly a stationary feedback equilibrium. In the proposed game the regulator has the ability to turn the optimal allocation of their efforts between pollution abatement and taxation of the polluting firms. During the game, the regulator's criterion is the minimization of the total discounted costs, while the criterion of the polluting firms is their utility maximization. Next, sensitivity analyses regarding the efficiency parameters of both players are provided. The conclusions are that a farsighted regulator should put much effort in abatement measures (instead of taxation measures) as well as in the improvement of abatement efficiency.

Keywords: Optimal abatement; Taxation; Differential games; Feedback equilibrium.

JEL Codes: C61; C62; C7; H21; Q50; Q52; Q58.