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A Stochastic Optimal Control Model of Pollution Abatement

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Abstract: We model a dynamic monopoly with environmental externalities, investigating the adoption of a tax levied on the firm's instantaneous contribution to the accumulation of pollution. The latter process is subject to a shock, which is i.i.d. across instants. We prove the existence of an optimal tax rate such that the monopoly replicates the same steady state welfare level as under social planning. Yet, the corresponding output level, R&D investment for environmental friendly technologies and surplus distribution necessarily differ from the socially optimal ones.

Keywords: *environmental externality; stochastic shock; optimal taxation; differential game.*

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