

Stochastic Control Model for Optimal Timing of Climate Policies

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Abstract. A stochastic control model is proposed as a paradigm for the design of optimal timing of greenhouse gas (GHG) emission abatement. The resolution of uncertainty concerning climate sensitivity and the technological breakthrough providing access to a carbon-free production economy are modeled as controlled stochastic jump processes. The optimal policy is characterized using the dynamic programming solution to a piecewise deterministic optimal control problem. A numerical illustration is developed with a set of parameters calibrated on recently proposed models for integrated assessment of climate policies. The results are interpreted and the insights they provide on the timing issue of climate policy are discussed.

Keywords. Climate policies, environmental hedging strategies, piecewise deterministic markov process, stochastic control