

Martingale selection problem and asset pricing in finite discrete time

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Abstract

Given a set-valued stochastic process $(V_t)_{t=0, \dots, T}$, we say that the martingale selection problem is solvable if there exists an adapted sequence of selectors ξ_t in V_t , admitting an equivalent martingale measure. The aim of this note is to underline the connection between this problem and the problems of asset pricing in general discrete-time market models with portfolio constraints and transaction costs. For the case of relatively open convex sets $V_t(\omega)$ we present effective necessary and sufficient conditions for the solvability of a suitably generalized martingale selection problem. We show that this result allows to obtain computationally feasible formulas for the price bounds of contingent claims. For the case of currency markets we also sketch a new proof of the first fundamental theorem of asset pricing.

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