Equilibrium pricing in incomplete markets under translation invariant preferences

Patrick Cheridito

Princeton University

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We propose a general discrete-time framework for deriving equilibrium prices of financial securities. It allows for heterogeneous agents, unspanned random endowments and convex trading constraints. We give a dual characterization of equilibria and provide general results on their existence and uniqueness. In the special case where all agents have preferences of the same type, and in equilibrium, all random endowments are replicable by trading in the financial market, we show that a one-fund theorem holds and give an explicit expression for the equilibrium pricing kernel. If the underlying noise is generated by finitely many Bernoulli random walks, the equilibrium dynamics can be described by a system of coupled backward stochastic difference equations, which in the continuous-time limit becomes a multi-dimensional backward stochastic differential equation. If the market is complete in equilibrium, the system of equations decouples, but if not, one needs to keep track of the prices and continuation values of all agents to solve it. Joint work with Ulrich Horst, Michael Kupper and Traian Pirvu.