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Equilibrium Pricing in Incomplete Markets under Translation Invariant Preferences

We provide results on the existence and uniqueness of equilibrium in dynamically incomplete financial markets in discrete time. Our framework allows for heterogeneous agents, unspanned random endowments and convex trading constraints. In the special case where all agents have preferences of the same type and 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 multidimensional 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. As an example we simulate option prices in the presence of stochastic volatility, demand pressure and short-selling constraints.