

Arbitrage-free market models for option prices

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ABSTRACT

Consider a market in which there are three kinds of assets: a riskless bank account, a stock, and a family of European call options written on that stock. We assume that all these assets are liquidly traded and study the problem of specifying arbitrage-free dynamics for their price processes. This should be done in such a way that calibration to observed market prices is practically feasible. We show that this leads to nontrivial parametrization problems and explain in several situations how these can be overcome. Moreover, we prove existence and uniqueness results for classes of such dynamics in situations with an infinite number of options.