Jaksa Cvitanic

University of Southern California

Computational Finance Seminar,
March 14

Abstract

In this talk, we consider a principal-agent setting in continuous-time, first when both have perfect information. The agent can control both the drift (the "mean") and the volatility (the "variance") of the stochastic process the principal is interested in. The principal offers a "European option"-type contract to the agent. We characterize the optimal contract in general diffusion models, and with a general cost function using two approaches. One approach is based on martingale/duality methods familiar from the theory of continuous-time optimal portfolio selection, and the other approach is based on the Maximum Principle of Stochastic Control and Forward-Backward Stochastic Differential Equations. The latter approach can be used also for problems with asymmetric information, in which the principal does not observe the agent's actions.

We show in examples that if the principal and the agent have the same CRRA utility, or they both have (possibly different) CARA utilities, the optimal contract is (ex-post) linear; if they have different CRRA utilities, the optimal contract is nonlinear. We also present an example in which a call option-type contract is optimal.