

Optimal Investment with Derivative Securities

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Abstract

We study the problem of portfolio optimization in an incomplete market using derivatives as well as basic assets such as stocks. In such markets, an investor may want to use derivatives, as a proxy for trading volatility, for instance, but they should be traded statically, or relatively infrequently, compared with assumed continuous trading of stocks, because of the much larger transaction costs. We discuss the computational tractability obtained by assuming exponential utility, and the relation of the optimal strategy to the method of utility-indifference pricing. In particular, we show that the optimal number of derivatives to invest in is given by the Legendre transform of the indifference price as a function of quantity, evaluated at the market price. Within popular diffusion stochastic volatility models, we discuss computational approaches for the associated quasilinear indifference pricing PDE.

Joint work with A. Ilhan and M. Jonsson.