OPTIMAL ALLOCATION-CONSUMPTION PROBLEM FOR A PORTFOLIO WITH AN ILLIQUID ASSET

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In times of financial crises many investors have to manage portfolios with low liquidity or illiquid assets, where the paper value of an asset may significantly differ from the actual price proposed by the buyer.

We consider an optimization problem for a portfolio that includes an illiquid asset, a risky and a riskless asset. In order to find the optimal policies we work in the optimal consumption framework with continuous time, proposed by Merton.

The liquid part of the investment is described by a standard Black-Scholes market.

We assume that the illiquid asset is sold at a random moment of time with prescribed distribution while generating continuous additional liquid wealth dependent on its paper value.

We also assume that the investor has a HARA-type utility function or, in particular, the logarithmic utility function as a limit case. We study two different distributions of the selling time of the illiquid asset - the classical exponential distribution and a more practically relevant Weibull distribution. Under certain condition we establish smoothness of the viscosity solution for the optimal strategy and establish a closed formula relevant for numerical calculations.