THE MEAN VARIANCE HEDGING IN A GENERAL JUMP MODEL

XIONG DEWEN

Abstract. We consider a financial market in which the discounted price process $S$ is an $\mathbb{R}^d$-valued semimartingale with bounded jumps, and the variance-optimal martingale measure (VOMM) $Q^{opt}$ is only a signed measure. We first give a backward semimartingale equation (BSE) and show that this density process $Z^{opt}$ of $Q^{opt}$ with respect to $P$ is a stochastic exponential which may be negative if and only if the BSE has a solution. For a general contingent claim $H$, we consider the following kind of mean-variance hedging

$$\min_{\pi \in \text{Adm}} \mathbb{E}\{ |H - X^\pi_{\tilde{\tau}}|^2 I_{\tilde{\tau} > T} \},$$

where $\tilde{\tau} = \inf\{t > 0; Z^{opt}_t = 0\}$. We represent the optimal strategy and the optimal cost of the mean-variance hedging by means of another backward martingale equation (BME) and an appropriate predictable process $\delta$. 

1