Optimal logarithmic utility for insiders in Lévy market

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Let L be a 1-dimensional Lévy process. Suppose that the discounted stock price of a stock is given by

$$\widehat{S}_t = S_0 \exp\Big((b - r - \frac{c^2}{2})t + L_t\Big), \quad 0 \le t \le T.$$

We regard insider's knowledge as an enlargement of filtration following Karatzas-Pikovsky ([2]). Normal invester's filtration is $\{\mathcal{F}_t = \sigma(L_s, s \le t)\}_{0\le t\le T}$. Let H be a 1-dimensional Lévy process independent of L. We define insider's filtration by $\{\mathcal{G}_t = \mathcal{F}_t \vee \sigma(L_T + H_{(T-s)^\alpha}; s \le t)\}_{0\le t\le T}$, $0 < \alpha < 1$. So, the insider's portfolio $\{\pi_t\}$ is assumed to be $\{\mathcal{G}_t\}$-predictable. This means that the insider knows the maturity price of the stock which is disturbed by the independent progressive noise H.

We discuss in this talk whether the optimal logarithmic utility $\max_\pi E(\log \widehat{V}_T)$ is finite, where $\widehat{V}_t$ is the discounted wealth process defined by the equation $\widehat{V}_t = V_0 + \int_0^t \frac{\pi_{s-}\widehat{V}_{s-}}{\widehat{S}_{s-}} d\widehat{S}_s$. While in Brownian motion case the optimal logarithmic utility is finite ([1],[3]), in this case the result is very complicated.

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