Comparison of the risk-sensitive value measure and mean-variance approach under normal mixture

Nagoya University of Commerce & Business Jiro HODOSHIMA
Nagoya City University Tetsuya MISAWA
Nagoya City University Yoshio MIYAHARA

Miyahara (2010) proposed utility indifference pricing as a value measure when the utility function is an exponential type given by

$$u(x) = \frac{1}{\alpha}(1 - e^{-\alpha x}) \tag{1}$$

where α denotes the degree of risk aversion with $\alpha > 0$. The utility indifference price of a random cashflow $\boldsymbol{X}$ in this case is given by

$$-\frac{1}{\alpha}log E[e^{-\alpha X}] \tag{2}$$

and Miyahara called it the risk-sensitive value measure (RSVM) of $\boldsymbol{X}$ because it responds sensitively to loss and gain of $\boldsymbol{X}$. RSVM satisfies desirable properties as a value measure and it is the only possible candidate for the suitable value measure under a certain condition. We compare RSVM and mean-variance approach, given by

$$MV(\alpha) = E[\boldsymbol{X}] - \frac{\alpha}{2}V[\boldsymbol{X}], \tag{3}$$

when the underlying data-generating process is in the class of discrete normal mixture distributions. We provide formulas of RSVM and mean-variance approach and present comparison results by simulation and an empirical result using daily return data of Dow Jones Industrial Average Index.