Robust Portfolio Choice and Indifference Valuation*

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Abstract

We solve, theoretically and numerically, the problems of optimal portfolio choice and indifference valuation in a general continuous-time setting. The setting features (i) ambiguity and ambiguity averse preferences, (ii) discontinuities in the asset price processes, with a general and possibly infinite activity jump part next to a continuous diffusion part, and (iii) general and possibly non-convex trading constraints. We characterize our solutions as solutions to Backward Stochastic Differential Equations (BSDEs). We prove existence and uniqueness of the solution to the general class of BSDEs with jumps having a drift (or driver) that grows at most quadratically, encompassing the solutions to our portfolio choice and valuation problems as special cases. We provide an explicit decomposition of the excess return on an asset into a risk premium and an ambiguity premium, and a further decomposition into a piece stemming from the diffusion part and a piece stemming from the jump part. We further compute our solutions in a few examples by numerically solving the corresponding BSDEs using regression techniques.

Keywords: Robust preferences; Convex risk measures; Portfolio choice; BSDEs; Incomplete markets; Indifference valuation; Exponential utility; Relative entropy.

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