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Expected Utility Theory and Inner And Outer Measures of Loss Aversion*

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Abstract

We introduce a weak rank dependent utility (RDU) model, with one extra parameter compared to the canonical expected utility (EUT) model, which makes many of the same predictions as cumulative prospect theory (CPT). The model extends a set of nonconvex preferences to its maximal inner convex subset, satisfies stochastic dominance principles, resolves the Allais paradox, predicts CPT 4-fold pattern of risk attitudes, and characterizes reference dependent preferences. Unlike extant RDU models that transform probability weighting functions, our model transforms ranked choice sets while leaving objective probabilities intact. Cumulative prospect theory's (CPT) loss aversion index is a special case of the interior solution for the extra parameter for unconstrained utility maximization, and it is driven by tail probabilities in our model. We provide several examples to show how popular formulae for the loss aversion index can be classified into inner and outer measures of loss aversion via an approximate Radon-Nikodym formulation of the model. This resolves sources of disparity in estimating the loss aversion index with experimental data. We show that under extant approaches, the loss aversion index is best estimated by a mixture of inner and outer measures of itself. Furthermore, we identify a CPT paradox: The utility loss aversion index is unmeasurable under CPT nonexpected utility framework for mixed lotteries; but measurable for same under the expected utility paradigm adapted to our model.

Keywords: decision theory, loss aversion index, inner measure, outer measure, utility theory

JEL Classification: C02, D81

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