Multiple Expected Utilities on Finite Sets

Yutaka Nakamura
University of Tsukuba

Abstract. A multiple expected utility (EU) representation is given by a set of Aumann utilities whose simultaneous maximization represents preferences for gambles on a set of outcomes. This paper studies two types of multiple EU representations, dubbed weak-Pareto and strong-Pareto, on finite outcomes. Strong-Pareto representations are always transformed to weak-Pareto representations for the finite case. It is shown in the finite case that the set of Aumann utilities which is weak-Pareto but not strong-Pareto must be ratio-bounded. Uniqueness and parsimony of those representations are established. We present and discuss necessary and sufficient axioms for the existence of a weak-Pareto representation and its ratio-bounded version. While the set of Aumann utilities may be infinite, we study necessary and sufficient conditions when a finite set of Aumann utilities constitutes weak-Pareto, strong-Pareto, or mixed-Pareto representations.

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