Ambiguity Aversion, Malevolent Nature, and the Variational Representation of Preferences*

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July 2004

Abstract

In the classic Anscombe and Aumann decision setting, we give necessary and sufficient conditions that guarantee the existence of a *utility function* u on outcomes and an *ambiguity index* c on the set of all probabilities on the states of the world such that, for all acts f and g,

$$f \succsim g \Leftrightarrow \min_p \left(\int u(f)\, dp + c(p) \right) \geq \min_p \left(\int u(g)\, dp + c(p) \right).$$

The function u represents the decision maker's risk attitudes, while the index c captures his ambiguity attitudes.

The preferences we characterize include as special cases the *multiple priors preferences* of Gilboa and Schmeidler, the *multiplier preferences* of Hansen and Sargent, and the *mean-variance preferences* of Markowitz and Tobin. In this way we are able to provide a rigorous decision-theoretic foundation on the latter two models, which have been widely used in macroeconomics and finance.

*We thank Erio Castagnoli, Rose-Anne Dana, Larry Epstein, Peter Klibanoff, Bart Lipman, Mark Machina, Jianjun Miao, Sujoy Mukerji, and Emre Ozdenoren for helpful discussions and suggestions. We also thank seminar audiences at Bocconi, Boston Univ., Columbia, INSEAD, Messina, Michigan, NYU, Paris 1, Roma "La Sapienza", UCL, the 2004 RUD Conference (Evanston, Illinois), the FUR XI Conference (Cachan, France). Maccheroni and Marinacci gratefully acknowledge the financial support of the Ministero dell'Istruzione, dell'Università e della Ricerca; Rustichini gratefully acknowledges the financial support of the National Science Foundation (grant # 0136556).