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ECONOMETRIC APPLICATIONS OF MAXMIN EXPECTED UTILITY

Gary Chamberlain*
Harvard University

ABSTRACT

Gilboa and Schmeidler (1989) provide axioms on preferences that imply a set of distributions and a preference ordering based on the minimum expected utility with respect to this set. We consider joint distributions for data and for the random variables that, together with the agent's choice, determine utility-relevant outcomes; for example, a joint distribution for data that will be available when a portfolio decision is made and for future returns that will determine the value of the portfolio. The set of distributions is generated by combining a parametric model with a set of prior distributions. We seek a decision rule (a function of the data) that maximizes the minimum expected utility (or, equivalently, minimizes maximum risk) over the set of prior distributions. An algorithm is provided for the case of a finite set of prior distributions. It is based on finding the Bayes rule for a given prior and then solving a concave program to find the least-favorable prior distribution. The minmax value we obtain for the finite set of priors is a lower bound on the minmax risk for a larger set, such as the infinite set that includes all point masses on a Euclidean space, as in Wald (1950). An upper bound can be obtained by fixing a decision rule and finding its maximum risk. These bounds are applied to an estimation problem in an autoregressive model for panel data.

Key words: Mixture models; Minmax risk; Bayes decision rule; Least-favorable prior distribution; Concave program; Autoregression; Panel data

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Department of Economics, Harvard University, Cambridge, MA 02138
gary_chamberlain@harvard.edu