

Estimating Subjective Beliefs in the Laboratory

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This talk reviews recent developments in the estimation of subjective beliefs in a controlled laboratory environment. Contributions range from robust, practical methods for estimating subjective probabilities under strong identifying assumptions about the nature of subjective beliefs, uncertainty aversion, and the probabilistic sophistication of subjects, to relatively fragile inferential pyramids that allow us to relax and evaluate those identifying assumptions. A central theme is the complementarity of theory, experimental design, and structural econometric estimation. Experimental studies implementing these contributions are reviewed.

The first block of studies consider practical estimation of subjective probability, assuming for now a very well-behaved, Savage-consistent subject. There is a large theoretical literature on the elicitation of subjective probabilities, and an equally large empirical literature. However, there is a gulf between the two. The theoretical literature proposes a range of procedures that can be used to recover subjective probabilities, but stresses the need to make strong auxiliary assumptions or “calibrating adjustments” to elicited reports in order to recover the latent probability. With some notable exceptions, the empirical literature is intent on either making those strong assumptions or ignoring the need for calibration. We illustrate how one can *jointly estimate risk attitudes and subjective probabilities* using structural maximum likelihood methods. This allows the observer to make inferences about the latent subjective probability, calibrating for virtually any well-specified model of decision-making under risk (e.g., expected utility theory, or rank-dependent utility models).

The second block of studies start the evaluation of the strong, identifying assumptions.

Building on the motivation provided by the thought experiments of Ellsberg, we demonstrate how one can apply “recursive expected utility” representations to observed choices and estimate the extent of *uncertainty aversion* in behavior. It is also possible, and indeed required, that uncertainty aversion be estimated jointly with risk aversion. We discuss the strengths and weaknesses of the two dominant theoretical specifications in the literature, the “source-dependent risk attitudes model” and the “multiple priors model,” from the perspective of making them operational.

We then show how a “random coefficients” approach to estimating subjective *probability* in a sample can recover estimates of a non-degenerate subjective *probability distribution*. This salvage operation occurs under plausible theoretical assumptions and ideal experimental conditions that are easy to implement in the lab.

The first paper covers the estimation of subjective probabilities in an EUT or RDU world populated by Savages. The second paper covers the estimation of subjective probabilities and uncertainty aversion when you minimally wander off the EUT plantation. Appendices are likely of interest to specialists only, and are available on request from Glenn Harrison.

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