Comments

Bayesian econometrics: A reaction to Geweke

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From Prof. Geweke’s insightful venture into the past and future it becomes apparent that Bayesian statistics have gained popularity predominantly because of Markov Chain Monte Carlo (MCMC) sampling techniques that allow for the analysis of complex models and that often realize improved predictive estimates. The application of the Bayesian estimation machinery to analyze problems that could not be solved otherwise is admittedly an important asset, but that motivation is a pragmatic one. Although recent advances in MCMC may provide ‘pragmatic Bayesians’ with an edge in estimating complex models, non-Bayesian methods, such as simulated likelihood (Gouriéroux and Monfort, 1993) and stochastic EM (Diebolt and Ip, 1996) are rapidly closing the performance gap. One might conjecture that the rush to adopt Bayesian methods predicted by Geweke will be followed by a bust as these alternatives assert themselves. However, we conjecture that if the added value provided by the philosophical foundation of Bayesian inference is better exploited, its popularity will sustain.

Subjective Bayesian statistics, firmly rooted in probability theory (De Finetti, 1970), proposes that a model reflects a researcher’s belief about a phenomenon and that people can and should conceive of uncertainty about events as subjective probabilities (Savage, 1954). This formulation brings to the scene one of the reservations some have about the Bayesian approach: sensitivity of posterior predictive inference and decisions to the choice of the prior. Many ‘pragmatic Bayesians’ therefore choose noninformative priors for their model. However, using prior information sensibly improves inference and decision making (Berger, 1985), and priors are not transformation invariant, implying that an uninformative prior for one parameterization is an informative one for another. Certainly, the investigation of the sensitivity of the predictive distribution to the specification of the prior is critical, and challenges to the prior specification, as
part of the model assumptions, should be at the core of the regular process of scientific discourse.

Geweke's essay leaves the reader with the challenge of ‘Demonstrating the return to formal probability forecasting and decision making in real settings’. This challenge requires not only models with better predictive power, but also mechanisms and institutions to elicit and to compare prior distributions and utility functions (Wakker and Deneffe, 1996) in order to complete decision models. Building on the pioneering work of Dempster (1968), who proposed to elicit lower and upper bounds for prior probabilities, techniques for elicitation of beliefs about probabilities are relatively well developed in the psychological literature. Unfortunately, in much applied Bayesian econometrics, the specification of the prior is confined to the parameters of the model, while one often takes the parameterization, the measure on the parameter space, and the functional model from as given.

We suggest that emphasis in Bayesian econometrics should shift from inference towards the entire decision problem. Frequently, as econometricians we become so removed from that problem that we become overly attentive to parameter estimation and lose sight of its role in the decision making. Econometricians design models with marginally better predictive power than existing models, but evidently their efforts may not realize their full potential in decision making until put into the framework of the decision making process. A shift in emphasis would make methods by which priors and utility functions can be elicited from decision makers and methods for examining the sensitivity of decisions to wide classes of priors and utilities even more critical. Better models will surely lead to better probability estimates, although we currently may be reaching the limits of what can be attained. However, better decisions require better procedures to elicit subjective information and to examine their impact on the decision problem.

References