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A Frequentist Approach to Bayesian Asymptotics

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Abstract:

Ergodic theorem shows that ergodic averages of the posterior draws converge in probability to the posterior mean under the stationarity assumption. The literature also shows that the posterior distribution is asymptotically normal when the sample size of the original data considered goes to infinity. To the best of our knowledge, there is little discussion on the large sample behaviour of the posterior mean. In this paper, we aim to fill this gap. In particular, we extend the posterior mean idea to the conditional mean case, which is conditioning on a given vector of summary statistics of the original data. We establish a new asymptotic theory for the conditional mean estimator for the case when both the sample size of the original data concerned and the number of Markov chain Monte Carlo iterations go to infinity. Simulation studies show that this conditional mean estimator has very good finite sample performance. In addition, we employ the conditional mean estimator to estimate a GARCH(1,1) model for S&P 500 stock returns and find that the conditional mean estimator performs better than quasi-maximum likelihood estimation in terms of out-of-sample forecasting.

Keywords: Bayesian average, conditional mean estimation, ergodic theorem, summary statistic

JEL Classification: C11, C15, C21

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