Bayesian Generalized Method of Moments Analysis for Complex Surveys

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Abstract: We consider Bayesian generalized method of moments inference with complex survey data where the finite population parameters are defined through the census estimating equations. The posterior distribution is formulated under the framework of generalized method of moments. We systematically evaluate large sample properties of the posterior density with any fixed or shrinking priors under the design-based framework. We show that the posterior distribution has the same shape of the quasi-log-likelihood function induced from the generalized method of moments quadratic function when the prior distribution is noninformative. Our results are valid under general unequal probability sampling designs with very mild conditions on the estimating functions and have major advantages on parameters defined through nonsmooth estimating functions. An effective Markov Chain Monte Carlo algorithm is developed to compute the proposed Bayes estimator and Bayesian credible intervals. Simulation results demonstrate that the proposed method works remarkably well for finite samples.