BAYESIAN ESTIMATION OF A GENERAL HEAPING MODEL VIA DIFFERENT RANDOM-WALK METROPOLIS SPECIFICATIONS

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Heaping is a general tendency of survey respondents to report income data rounded off to the nearby modulos. There can be differences to which degree heaping occurs, i.e. possible modulos can be 100, 500, or 1000. We developed a general method to account for different heaping patterns [6,5]. A mixture model describes the underlying zero-inflated log-normal distribution and the supposed heaping mechanism. For the sake of simplicity, we assume that the probabilities of heaping to specific heaping points (modulos) are constant within predefined intervals. The parameters of the mixture model are estimated simultaneously using five different random-walk Metropolis schemes for computation: a single-block scheme, a multiple-block scheme (MB), a randomized multiple-block scheme (RMB) [1], and two adaptive schemes (AP, AM) [3,4]. The results are compared by their inefficiency factors and marginal likelihoods [1,2]. Results from a simulation study show that estimates are better approximated by either MB or RMB schemes. The proposed method is applied to income data of the National Educational Panel Study (NEPS). The performance of application is explored by posterior predictive checks and demonstrates a good fit of the general heaping model.

Keywords: heaping; random-walk Metropolis algorithm; multiple-block scheme; adaptive MCMC

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