Pseudo Maximum Likelihood Estimation of Multilevel Generalized Linear Models

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Abstract

We discuss pseudo maximum likelihood estimation of multilevel generalized linear models for complex surveys involving multistage sampling, unequal sampling probabilities, and stratification. The pseudolikelihood methodology is applied to complex survey data on reading proficiency from the American sample of the 2000 PISA study, using the Stata program gllamm which accommodates a wide range of multilevel and latent variable models. When level-1 weights that vary between elementary units in clusters are used, the scaling of the weights becomes important and not only variance components but also regression coefficients can be severely biased in the dichotomous case. The performance of pseudo maximum likelihood with different

methods for handling level-1 weights is investigated in a Monte Carlo experiment.