Winsorization on Small Area Inference with Positively Skewed Distributions

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Abstract

Many research on small area estimation (SAE) is typically based on a linear mixed model (LMM) assumptions. When the relationship between the interest and the auxiliary variables is not linear in the original scale, the SAE based on LMM could be inefficient. However, in practice, particularly in economic fields, the interest variable such as revenue or expenditure often does not follow normal distribution.

In this paper we will discuss the performance of SAE when the variable of interest does not follow normal distribution, but particularly it can be modeled by log-scaled transformation. Kurnia and Chambers (2011) used the bias correction proposed by Karlberg (2000) to produce the estimator of the small area mean for positively skewed data. However, the extreme outliers still affect the outcomes of the estimation. To overcome this matter, we used winsorization technique in linear mixed model fitting. The results indicated that Winsorization technique can be used as an alternative method to overcome outliers in SAE.
Keywords: winsorization, long tail distribution, small area estimation