

AN APPLICATION OF UNIT-LEVEL MODEL FOR FRACTIONS OF UNEMPLOYED

Tomas Rudys

Vilnius University Institute of Mathematics and Informatics, Lithuania, tomas.rudys@mii.vu.lt

We are interested in estimating the fractions of unemployed for small areas using Lithuania Labor Force survey data. In practice often happens that the estimates for small areas are needed after the realization of the sample, that is during the construction of sample design not enough attention was given to get adequate sample size in all small areas. Later, using the design-based estimators and having not sufficient sample sizes in small areas, this leads to get estimates of an not adequate precision. In this work we are using model-based approach to get small area estimates for fractions of unemployed. Very important role in this case plays the auxiliary information which could be available at unit level or at more aggregated levels. The use of unit level auxiliary information may lead to get more precise estimates for small areas. Here we are using two-phase unit-level model ([1,2,3]) to get the estimates for fractions of unemployed. Model checking is done by analyzing how model fits the data. An inference to unknown model parameters is done by using Bayesian approach. We are comparing Bayesian and frequentist approaches for estimating unknown model parameters by modeling. For the Bayesian inference the R package LaplacesDemon is used ([4]).

References

1. H. J. Boonstra, B. Buelens, and M. Smeets. *Estimation of municipal unemployment fractions – a simulation study comparing different small area estimators*, Statistics Netherlands, Projectnr: DMH-205714 (2009).
2. P. J. Farrell. *Bayesian inference for small area proportions*, Sankhya: The Journal of Statistics, 2000, Volume 62, Series B, Pt. 3, pp. 402-416.
3. J. N. K. Rao, *Small area estimation*, Hoboken: John Wiley & Sons (2003).
4. Statisticat LLC (2014). *LaplacesDemon: Complete environment for Bayesian Inference*. R package version 14.04.05, URL <http://www.bayesian-inference.com/software>.