

**Empirical Likelihood confidence regions for regression parameters  
under unequal probability sampling**

Yves G BERGER\*

University of Southampton, Southampton Statistical Sciences Research Institute  
Southampton, SO17 1BJ, United Kingdom  
Y.G.Berger@soton.ac.uk

We propose a new empirical likelihood approach which can be used to construct design-based confidence regions of regression parameters under unequal probability sampling. The proposed approach gives confidence regions which may have better coverages than standard confidence regions and pseudo empirical likelihood confidence regions which rely on variance estimates and design-effects. The proposed approach does not rely on variance estimates, design-effects, re-sampling or linearisation, even when the regression parameter is not linear. It also gives suitable confidence regions when the point estimator is biased. The proposed approach can also be adjusted to account for large sampling fractions.

Key Words: Design-based approach, Estimating equations, Regression estimator, Unequal inclusion probabilities.