Abstract:

In many large-scale surveys, mean or total estimates are often produced for large numbers of domains. This can lead to small domain sample sizes, with resulting unreliable survey estimates. When a priori qualitative constraints between domain means can be specified, it is natural to attempt to ensure that the estimates likewise satisfy the constraints, with the goal of improving the precision of the estimates and their acceptability by data users. We describe constrained estimation methods for domains under a general framework of cone projection, which can handle any set of linear inequality constraints between domain means. The asymptotic properties of the methods are obtained within a classical design-based inferential framework. As a practical approach for detecting possible violations of the qualitative constraints in the sample data, we propose a Cone Information Criterion modified for the survey setting.