

| | | | |
|--|--|---|---|
| Tiedekunta-Fakultet-Faculty Valtiotieteellinen tiedekunta | | Laitos-Institution-Department Department of Statistics | |
| Tekijä-Författare-Author Ollila, Pauli | | | |
| Työn nimi-Arbetets titel-Title A theoretical overview for variance estimation in sampling theory with some new techniques for complex estimators | | | |
| Oppiaine-Läroämne-Subject Statistics | | | |
| Työn laji-Arbetets art-Level Doctoral dissertation | | Aika-Datum-Month and year 2004-09-03 | Sivumäärä-Sidantal-Number of pages 152 |
| Tiivistelmä-Referat-Abstract When making judgements of the quality of survey sampling, especially with the complex estimators, the method of variance estimation is of importance. In addition to the well-known linearisation approach, there are many methods based on the sample reuse. The variety of these methods, especially in sampling theory, does not have any unified theoretical framework. The first part of the thesis is a theoretical overview for variance estimation, covering the foundations of the sampling theory and the current methodology of variance estimation. Also new methods and theoretical results are provided in the thesis. The cumulants and k-statistics are utilised to study the theoretical correction coefficient of unbiased variance estimation. Some examples of this approach are given for the variance estimation of the estimator of the population variance. The post-design vectors, i.e. artificially expanded design vectors for variance estimation, are used as the scale adjustment needed to correct the effect of the difference between the sampling design and resampling design. There are also correction methods utilising two-phase resample spaces and alternatively two resample to introduce various estimator-dependent scale corrections. New sampling distribution results concerning without-replacement and with-replacement designs in two-phase sampling situations are presented. A variance decomposition approach utilising sample pair probabilities is given with variance estimators. Finally, both old and new methods are tested with two real small populations. Results reveal e.g. that the two-phase resample approach deminishes the bias almost for every estimator studied, and for one estimator the sample pair probability approach provides unbiased variance estimator. | | | |
| Avainsanat-Nyckelord-Keywords sampling theory variance estimation complex estimators resampling methods | | | |
| Säilytyspaikka-Förvaringsställe-Where deposited | | | |
| Muita tietoja-Övriga uppgifter-Additional information Research Reports of Statistics Finland, ISSN 0355-2071 | | | |