HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

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Risto Lehtonen, University of Helsinki

SUMMARY

Estimation for domains (small OR large)

Key points and aspects

A. Domain structure
A.1 Planned (stratified sampling, domains=strata)
A.2 Unplanned (typical case in SAE)

B. Model
B.1 Specification and parametrization
B.1.1 Fixed-effects model
B.1.2 Mixed model
B.2 Functional form
B.2.1 Linear model
B.2.2 GLMM

C. Estimator of domain parameters (totals, means)
C.1 Type of estimator
C.1.1 Design-based
C.1.2 Model-based
C.2 Borrowing strength
C.2.1 Direct estimators: NO borrowing strength from other domains
C.2.2 Indirect estimators: YES

MORE DETAILS

C.1 Type of estimator

C.1.1 Design-based

a) Direct estimators
HT (no aux. information)
Hájek (aux. informatio: domain sizes)

b) Model-assisted estimators
Can be direct or indirect
Model: B1.1, B.1.2, B.2.1, B2.2

GREG estimators
Model calibration estimators
Model-free calibration estimators

C.1.2 Model-based estimators

a) Synthetic estimators SYN
Can be direct or indirect
Assisting model: B1.1 & B2.1
Not recommended

b) EBLUP estimators
Empirical best linear unbiased predictor
Always of indirect type
Assisting model: B1.2 & B2.2
Recommended

Table 1. Properties of estimators - REVISITED (Lehtonen and Veijanen 2009)

	DESIGN-BASED HT, Hájek , GREG	**MODEL-BASED** SYN and EBLUP
Design bias	Nearly design unbiased	Design biased Bias does not necessarily approach zero with increasing domain sample size
Precision (Variance)	Variance can be large for domains with small sample size Variance declines with increasing sample size	Variance can be small also for small domains Variance declines with increasing sample size
Accuracy (MSE)	MSE = Variance (approximately)	MSE = Variance + squared Bias Accuracy can be poor if design bias dominates the MSE
Confidence intervals	Valid design-based confidence intervals can be constructed	Valid design-based confidence intervals not necessarily obtained (if bias dominates the MSE)