

# Recent developments in Small Area Estimation: a microsimulation technology

by

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## **Abstract:**

Small area estimation has received significant attention in the developed world due to increasing demand of reliable small area estimates from both public and private sectors for various social and economic policy analysis and decision makings. Most of the review articles in small area estimation have highlighted methodologies which are entirely based on various statistical models and theories. The typical implicit models based approaches consist of synthetic, composite and demographic estimations which are very old fashioned. As well, explicit area level and unit level models based approaches have been widely utilised through various statistical tools and techniques including (empirical-) best linear unbiased prediction (E-BLUP), empirical Bayes (EB) and hierarchical Bayes (HB) methods. Recently another type of approaches called 'microsimulation technology (MT)' has been becoming very useful means for small area estimation. The state of the art method MT is based on economic theory and using quite different methodologies including geographic model. This paper provides a comprehensive appraisal of various methods in small area estimation with particular emphasis given to an MT approach of indirect estimations.

Findings demonstrate that the MT approach is robust and has some significant advantages over the other methods. MT operates through a number of reweighting tools such as GREGWT and combinatorial optimisation. A comparison of various reweighting tools reveals that they are using quite different algorithms and that their properties also vary. However their performances are rather similar due to the advantages of MT. Empirical results also supports these findings.

**Key words:** Empirical and hierarchical Bayes; explicit area level models; microsimulation technology (MT); reweighting; small area