Three-level M-quantile model for small area poverty mapping

*Modello M-quantile a tre livelli per mappare la povertà a livello di piccole aree*

Stefano Marchetti and Nicola Salvati

**Sommario** A three-level M-quantile model for small area estimation is proposed. The methodology represents an efficient alternative to prediction by using a three-level linear mixed model in the presence of outliers and it is based on an extension of M-quantile regression. The methodology proposed is evaluated and compared to alternative models (M-quantile two-level, Empirical Best predictor based on two and three level linear mixed model) by means of model-based and design-based Monte Carlo simulations. Moreover, it is applied to Polish European Union Survey on Income and Living Conditions and census data to estimate poverty at local administrative unit 1 level in Poland, i.e. the level for which the Central Statistical Office of Poland has not published any official estimates to date.

**Key words:** European Survey on Income and Living Conditions, Polish Census of Population and Housing 2011, Poverty indicators, Small area estimation

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