

Income estimation for small sample size

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1. Introduction. Household budget survey (HBS) is one of the most important sample surveys in official statistics of every country. It estimates income in cash and kind and expenditure per capita of the population of the country and in various parts of the population.

The Lithuanian HBS uses a stratified two stage sampling design. Estimator of income per capita is investigated like estimator of the ratio of two totals. A sample size and the accuracy of the estimates in the rural area of districts are low. Small area estimation methods using auxiliary information from the neighboring areas are applied in order to improve the accuracy of the estimates of the income per capita in the rural area of Lithuania.

2. Methods used. The data of the HBS survey of the fourth quarter of 2002 are used here for estimation. Two kinds of small area estimators – James-Stein estimator ([2]) and empirical best linear unbiased predictor (EBLUP) ([3]) – are applied. The linear regression model of income per capita is build. Demographical data and agricultural production data are used to it. The direct estimates, based on the sample design, and currently used calibrated estimates ([1]) are also presented to compare.

The modelling results are aimed at choosing the most suitable estimators in HBS ([4])

3. Estimation results. The James-Stein estimator performs better than the direct one. The MSE of the composite estimator EBLUP performs equally along the areas, improving a very low accuracy of the direct estimator in some areas, however, without any improvement in the average accuracy. It can be explained by the low correlation between the direct estimates in the areas and auxiliary variables. The currently used calibrated estimator has the smallest average estimated mean square error over the small areas.

References

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