

ESTIMATION OF THE SENSITIVE PROPORTION IN ITEM COUNT MODELS UNDER SOME ASSUMPTIONS VIOLATION

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Abstract

Item count techniques (ICTs) are established and widely applicable methods for surveys with sensitive questions. Estimation of the unconditional probability of possessing the sensitive attribute, i.e. estimation of the sensitive proportion is of main importance. Due to the fact that some control variable (or variables) is used in all item count models the problem of the precision and efficiency of the estimation is especially important. Although in social science practice moment-based estimators are widely used, in the modern methodology of the item count techniques the problem is treated as a problem of incomplete data and therefore ML estimators via either EM or Newton-Raphson algorithm are employed. But the use of a parameter approach to item count methods introduces new problems regarding control variable modelling. To our best knowledge the problem of robustness of various item count models concerning violation of the control variable distribution assumptions has not been studied so far. In the paper we analyze different estimation approaches in various item count techniques, including Poisson and negative binomial ICTs and ICTs with a continuous control variable by taking into account violation of the control variable distribution assumptions. We conduct a comprehensive Monte Carlo simulation study and address the consequences of violations of the theoretical assumptions.

Keywords: surveys with sensitive questions, item count techniques, EM algorithm, robustness.

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