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Estimation with multivariate outcomes having nonignorable item nonresponse

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Abstract

To estimate unknown population parameters based on $\boldsymbol{y}$, a vector of multivariate outcomes having nonignorable item nonresponse that directly depends on $\boldsymbol{y}$, we propose an innovative inverse propensity weighting approach when the joint distribution of $\boldsymbol{y}$ and associated covariate $\boldsymbol{x}$ is nonparametric and the nonresponse probability conditional on $\boldsymbol{y}$ and $\boldsymbol{x}$ has a parametric form. To deal with the identifiability issue, we utilize a nonresponse instrument $\boldsymbol{z}$, an auxiliary variable related to $\boldsymbol{y}$ but not related to the nonresponse probability conditional on $\boldsymbol{y}$ and $\boldsymbol{x}$. We utilize a modified generalized method of moments to obtain estimators of the parameters in the nonresponse probability. Simulation results are presented and an application is illustrated in a real data set.

Keywords Generalized method of moments · Item nonresponse · Inverse propensity weighting · Multivariate outcome · Nonresponse instrument

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