Estimation in Binary Choice Models with Measurement Errors

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A central concept in our analysis of the binary choice model with errors in the explanatory. variables is the reliability ratio (π), i.e. the ratio between the variance of a true (unobserved) explanatory variable and the variance of the corresponding observed variable. The traditional approach is to assume without reflection that $\pi = 1$ (no measurement error), which can lead to serious inconsistencies when $\pi < 1$.

In this paper we develop ML point estimates of the parameters in the probit model when the reliability ratios for the different explanatory variables are known, but not necessarily equal to each other. We also show how "reasonable" bounds on the parameters can be calculated when there is only weak information about the reliability ratios. Monte Carlo simulations show that the traditional estimates are very poor when there is measurement error, but that the MLE are consistent and work well in small samples

We also apply our methods to Swedish data concerning the incidence of sick leave. In our model the income variable is suspected to be measured with error and unemployment is used as a proxy for economic activity. The reasonable bounds approach is shown to be of considerable help towards obtaining better inferences.

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