

The estimation of the AFT model with measurement errors—the Buckley James approach

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Abstract

The Accelerated Failure Time (AFT) model is a widely used framework in survival analysis, providing an intuitive interpretation of the effects of covariates on log-lifetime. This paper addresses the estimation problem when covariates are subject to measurement error. We begin by correcting the bias in the estimating function using the traditional approach, assuming no censoring, and then extend the method by computing its conditional expectation given the censoring indicator, in line with the Buckley–James estimation framework. However, the computation requires estimating the distribution of the adjusted lifetime. Since measurement error induces dependence between the adjusted lifetime and censoring time, we propose employing Beran’s estimator to address this complication. Simulation results demonstrate that the proposed method outperforms conventional regression calibration and remains consistent under completely random censoring.