Improving the estimation of Kendalls tau when censoring affects only one of the variables

David Beaudoin
`packersbills@hotmail.com`
Département de mathématiques et statistiques
Université Laval
Québec, Québec, G1K 7P4

Abstract

This paper considers the estimation of Kendalls tau for bivariate data (X, Y) when only X is subject to right-censoring. The estimators proposed by Brown et al. (1974), Weier and Basu (1980), and Oakes (1982), which are standard in this context, fail to be consistent when $6 = 0$ because they only use information from the marginal distributions. Wang and Wells (2000) were the first to propose an estimator which accounts for joint information. Four more are developed here: the first three extend the methods of Oakes (1982), Brown et al. (1974) and Weier and Basu (1980) to account for information provided by Y, while the fourth estimator inverts $c\Pr(X_i x \mid Y_i = y_i, X_i > C_i)$ to get an imputation of the value of X_i censored at C_i. In addition, a new nonparametric estimator is proposed which averages the i obtained from a large number of possible configurations of the observed data $(Z_1, Y_1), \ldots, (Z_n, Y_n)$, where $Z_i = \min(X_i, C_i)$. Simulations are presented which compare these various estimators of Kendalls tau to four standard competitors. An illustration involving the well-known Stanford heart transplant data is also presented. J

Joint work with *Christian Genest et Thierry Duchesne.*