

Sample Selection, Heteroscedasticity, and Quantile Regression

Blaise Melly, Martin Huber

Preliminary

First draft: December 2006, Last changes: February 2008

Abstract:

Independence of the error term and the covariates is a crucial assumption in virtually all sample selection models. If this assumption is not satisfied, for instance due to heteroscedasticity, both mean and quantile regression estimators are inconsistent. If independence holds indeed, all quantile functions and the mean function are parallel, which naturally limits the usefulness of quantile estimators. However, quantile estimators can be used to build tests for the independence condition because they are consistent under the null hypothesis. Therefore, we propose powerful tests based on the whole conditional quantile regression process. If the independence assumption is violated, quantile functions are not point identified, but we show that it is still possible to bound the coefficients of interest. Our identified set shrinks to a single point either if independence holds or if some observations are selected and observed with probability one. Therefore, our model generalizes simultaneously the traditional sample selection models and the identification at infinity strategy.

Keywords: sample selection, quantile regression, heteroscedasticity, test, bootstrap, bounds

JEL classification: C12, C13, C14, C21

We have benefited from comments by Michael Lechner and seminar participants at the University of St. Gallen. Addresses for correspondence: Blaise Melly, MIT Department of Economics, 50 Memorial Drive, E52-251d, Cambridge, MA 02142, USA, melly@mit.edu, www.siaw.unisg.ch/lechner/melly; Martin Huber, SIAW, University of St. Gallen, Bodanstrasse 8, 9000 St. Gallen, Switzerland, martin.huber@unisg.ch.