M-estimation was introduced by Huber (1964) as a general framework for robust estimation. Breckling and Chambers (1988) extended the use of M-estimation to M-quantile regression which presents a quantile-type generalisation of regression based on influence functions and is an alternative to standard quantile regression. Since then, a number of authors have used M-quantile regression for predicting finite population parameters (Chambers and Tzavidis, 2006; Chambers et al., 2014). In order to ensure that M-quantiles are scale invariant, we need to define and estimate a scale parameter. The most commonly used robust scale estimator is the mean absolute deviation (MAD). However, the use of the MAD estimator may not be fully justified in the case of M-quantile regression especially as we move away from the centre of the distribution.

In this talk we assess the appropriateness of estimating the scale in M-quantile regression by using the MAD estimator and compare this to two recently proposed alternative scale estimators. The first is a maximum likelihood estimator under the assumption of an Asymmetric Least Informative (ALI) distribution (Bianchi et al., 2015). The second scale estimator, proposed in this talk, is a method of moments one that is also based on the ALI distribution. The different scale estimators will be discussed in detail and the properties of the new, method of moments, estimator will be assessed. Comparisons are performed via an extensive simulation study and the use of a real business survey data set. Finally, the impact of using different scale estimators on selecting an optimal tuning constant for the Huber influence function will be discussed.