Nonparametric estimation of extreme risks from heavy-tailed distributions

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Abstract: Value-at-risk, conditional tail expectation [1], conditional value-at-risk [4] and conditional tail variance [5] are classical risk measures. For instance, the value-at-risk is defined as the upper $\alpha$-quantile of the loss distribution where $\alpha \in (0, 1)$ is the confidence level. In this communication, we propose nonparametric estimators of these risk measures for extreme losses, i.e. when $\alpha \to 0$ and in the case of heavy-tailed distributions depending on covariates. Let us note that the presence of covariates in extreme value theory has already been investigated for instance in [2, 3]. The asymptotic distribution of the estimators is established and their finite sample behavior is illustrated both on simulated data and on a real data set of daily rainfalls in the Cevennes-Vivarais region (France). This is joint work with Jonathan El Methni (LJK & Inria Grenoble Rhône-Alpes) and Laurent Gardes (University of Strasbourg).

Key words and phrases: Conditional tail expectation, heavy-tailed distributions, kernel estimator, risk measures, conditional quantiles.

References


