

Title: Model Uncertainty and Selection in Operational Risk Modeling

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Abstract: Model uncertainty arising from different ways treating the operational loss data collection threshold is investigated. Asymptotic normality of Value-at-Risk (VaR) estimates is established using the Delta method and asymptotic normality of Maximum-Likelihood Estimation parameter estimates. Evaluating the probability of overestimation/underestimation of the true target VaR in exponential and Lomax models, the truncated modeling approach turns out to be theoretically sound, while the shifted and naive approaches are fundamentally flawed. Using industry data of the external fraud type of event in the retail banking business line across major commercial banks in China for case study, the truncated lognormal, Lomax and Champernowne models are compared. They all pass visual inspection of Quantile-Quantile plots as well as model validation by the Kolmogorov-Smirnov test and the Anderson-Darling test. However, they produce quite different VaR estimates. In the model selection procedure, those models are compared using Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), and Information Complexity (ICOMP).