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EXTREME VALUE THEORY AND ITS APPLICATIONS TO FINANCIAL RISK MANAGEMENT

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Abstract

The phenomenon of high volatility in financial markets stemming from the increased complexity of financial instruments traded, as well as the evidence of losses due to natural and man-made catastrophes, highlight the need for sophisticated risk management practices. The analysis concerning the statistical distribution of extreme events (e.g. stock market crashes), is considered to be important for modern risk management. In this review paper, an introduction to the basic results of Extreme Value Theory (EVT) is made. More specifically, the methodological basis of EVT for quantile estimation is introduced. Moreover, EVT methods for estimating conditional probabilities concerning tail events, given that we incur a loss beyond a certain threshold u , are presented. Finally, the application of the theory is demonstrated by considering an example using equity return data.

Keywords: *central limit theorem, standard extreme value distributions, quantiles, mean excess function, Value-At-Risk, shortfall distribution, peaks over threshold-method.*