A semi-parametric approach to Value-at-Risk using the Generalised Pareto Distribution to account for fat tails in financial asset returns

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Abstract

We propose a semi-parametric approach to the estimation of Value-at-Risk, using the empirical distribution for small risks, and the Generalised Pareto Distribution, stemming from Extreme Value Theory, for larger risks. This method is applied on six of the main Equity Indices, and a comparative analysis with the Normal distribution is performed. Our method provides more accurate tail predictions and outperforms the Normal approach under backtesting analysis. We therefore, conclude that there is scope for the application of Extreme Value theory in quantile estimation for risk management purposes as a valid solution to the issue of fat tails in financial returns.