THE UNIVERSITY OF CHICAGO | **DEPARTMENT OF STATISTICS**

MASTER'S THESIS PRESENTATION

SAM TYLER

Department of Statistics
The University of Chicago

Non-Parametric VaR Estimation: Accounting for Fat Tails in Financial Risk Management

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ABSTRACT

Value-at-Risk (VaR) is one of the most popular metrics for financial risk management. While limited by the theoretical deficiency of not being sub-additive, it remains one of the most widely applied risk metrics by practitioners and is preferred to its sub-additive counterparts such as Expected Shortfall or Worst Conditional Expectation. In this paper, we evaluate a non-parametric estimate for the VaR of a portfolio of financial assets that incorporates the rate at which the true quantile diverges as the length of the return sequence increases. The portfolio return sequence follows a multivariate stochastic volatility model to capture the nonlinear nature of equity returns. Monte Carlo studies are performed to ensure the validity, consistency, and robustness of our approach, specifically with regards to heavy-tailed and other non-normal distributions. Lastly, the proposed estimate is applied to the return distributions of the S&P 500 Index, as well as other equity-based portfolios.