THE UNIVERSITY OF CHICAGO

Department of Statistics
MASTER'S THESIS PRESENTATION

WENLING JIANG

Department of Statistics
The University of Chicago

Testing for Uncorrelated Errors in ARMA Models and Intensity-Based Estimation of Value at Risk

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ABSTRACT

In this thesis, we start with the topic of testing for uncorrelated errors in autoregressive moving average (ARMA) models. Under the weak assumption that the errors are uncorrelated, a non-standard version of Andrews-Ploberger statistic is proposed and evaluated for diagnostic checking of ARMA residuals. Based on asymptotic distribution theory, the associated critical value is determined by Monte-Carlo methods. Then we discuss the methods for estimating extreme loss event probability and value at risk based on the conditional intensity of extreme losses. The time between consecutive losses are captured by log-autoregressive conditional duration (log-ACD) models. The conditional intensity is then derived and estimated with the use of pseudo-maximum likelihood estimations. Simulations and real dataset analysis on future prices in Chinese financial market are conducted for the performance and usefulness of the methods.