



THE UNIVERSITY OF
CHICAGO

Department of Statistics

MASTER'S THESIS PRESENTATION

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**Portfolio Value at Risk Estimation Univariate vs.
Multivariate GARCH Models**

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ABSTRACT

Traditional univariate volatility models failed to capture the uncertainty in financial markets when faced the financial crisis. Hence more researches are focused on the multivariate volatility models. This article evaluates the performance of GARCH family models, 5 univariate models and 3 multivariate models with normal and Students t error distribution, in estimating one-step-ahead Value-at-risk (VaR) of large portfolios. We use Violation rate, Kupiecs test and Christoffersens test to assess the accuracy of VaR forecasting. Empirical analysis with two portfolios indicates that Multivariate GARCH models generally perform better than univariate models. The AsyDCC-GARCH model with Students t distribution perform best in measuring ETFs portfolio VaR on an out-of-sample basis among all the candidate models, and DCC-GARCH with multi-normal distribution acts as the second best. The GO-GARCH model with Normal distribution performs best for NASDAQ stocks portfolio.

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