



THE UNIVERSITY OF
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Department of Statistics

MASTER'S THESIS PRESENTATION

STEVEN MOEN

Department of Statistics
The University of Chicago

Multivariate CAViaR: An Insightful Approach to Risk Modeling

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ABSTRACT

This thesis builds upon previous literature for modeling value-at-risk (defined as an $x\%$ quantile of an asset's daily returns) using non-linear ARMA terms by adding exchange-traded funds (ETFs) as explanatory variables that are combined into principal component vectors at the forecast origin. Combining these principal component vectors with transformations of lagged autoregressive response variables results in a model that produces similar predictive accuracy during periods of relatively low volatility along with more insight into the drivers of the changes in the response variable. In fact, one insight gained from the new model is a method of detecting changepoints in the economy by measuring the angle between resultant vectors calculated from the combination of principal component vectors during different time periods. This method, along with analysis of the statistical significance of the lagged ETFs, allows for insight into changes in the underlying economy.