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DEPARTMENT OF STATISTICS

Master's Thesis Presentation

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“Comparing Multivariate Value at Risk Forecasting Models: A
Reproduction and Empirical Extension”

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Abstract

This thesis studies the empirical performance of multivariate Value at Risk (VaR) forecasting models for equity portfolios. The first part reproduces the empirical design of Müller and Righi (2024), using Brazilian equity returns from Yahoo Finance and the same basic comparison across Historical Simulation, DCC-GARCH, GO-GARCH, and vine copula models. The reproduction uses portfolios of 6 and 12 assets, rolling windows of 500 and 1000 observations, and VaR levels of 1%, 2.5%, and 5%. Forecasts are evaluated using VaR forecast levels, forecast variability, violation rates, and realized loss. The second part extends the analysis to updated Brazilian data and a NASDAQ-100 universe, focusing on Historical Simulation, DCC-GARCH and GO-GARCH. The results show that model rankings are sensitive to the dataset, portfolio weights, window length, and significance level. DCC-GARCH, especially the student-specification, performs well in many of the reproduced and extended settings, while Historical Simulation is more transparent but less adaptive during changing volatility regimes. Overall, the results support the main lesson of the original paper: VaR model comparison is highly context-dependent, and reliable conclusions require evaluation across multiple portfolios, market environments, and model specifications.