



THE UNIVERSITY OF
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Department of Statistics

MASTER'S THESIS PRESENTATION

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QML-Based Confidence Intervals for ARMA-GARCH VaR—
A Comparison of Three Methods

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ABSTRACT

In financial risk management, Value-at-Risk (VaR) is used to address the question of how much the investor could lose in the worst scenario. The ARMA-GARCH model is a standard and useful model for time series data and can be used to estimate the VaR. In this work, we study different approaches for constructing confidence intervals for ARMA-GARCH VaR. In particular, we compare the performance of three methods, conventional bootstrap, normal approximation, and residual subsample bootstrap, from both a theoretical and a practical perspective. Theoretical conditions that are necessary for the three methods to have the nominal coverage probabilities are studied and compared, followed by an extensive simulated experiment with various error distributions and a real data application on stock return data. Our results show that conventional bootstrap is the best among the three when the error distribution has finite fourth moment, or is symmetric, while residual subsample bootstrap is more robust to ill-shaped error distributions. They also shed some lights on the important issue of how to pick tuning parameters for the three methods.

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