University of Zurich

Abstract

Master of Arts UZH in Business and Economics

Backtesting Forecasting Methods of Value at Risk and Expected Shortfall

by Markus Sven Müller
Bahnhaldenstrasse 11, CH-8052 Zürich
markus.mueller5@uzh.ch

Since Expected Shortfall (ES) has been assigned a crucial role for capital determination within banking regulation, a debate concerning its practicability has been going on. Primarily, doubts have been raised regarding the possibility to backtest corresponding risk measure forecasts. The starting point was confusion between model validation and model selection, which has motivated researchers to study and describe both areas thoroughly. On the other hand, regulation has not caught up and still proposes to backtest ES models by validating their Value at Risk (VaR) counterparts, the former prevailing risk measure. The thesis at hand presents validation and selection techniques for models estimating each of these two risk measures. An empirical study that focuses on the returns of a specific equity portfolio for a certain timeline, surveys reactions of different estimation approaches to changes in parameter settings. For this particular empirical setting, it is found that backtesting outcomes of the historical approach and of a Monte Carlo variant of it appear to be highly sensitive to the amount of past data used to make predictions as well as to the chosen confidence level. Two dynamic historical approaches which proceed in the core the same, demonstrate different backtesting outcomes as well, which is due to distinct distributional assumptions on the innovation term. It is shown that the variant with student-t innovations performs particularly good for strict confidence levels, such as those required by regulation. Furthermore, this approach is in the majority of cases ranked as the relatively most accurate one. On the other hand, critically inspecting the backtests by means of further empirical findings and based on relevant literature reveals that blindly trusting the numbers of backtesting methods falls short of an adequate model quality assessment. Estimation and model risk, usage of erroneous profit and loss data or distributional uncertainties of certain test statistics are among those issues that might result in inadequate risk predictions as well as distorted backtests.