Robust Backtesting Tests for Value-at-risk Models

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ABSTRACT

Backtesting methods are statistical tests designed to uncover value–at–risk (VaR) models not capable of reporting the correct unconditional coverage probability or filtering the serial dependence in the data. We show in this paper that these methods are subject to the presence of model risk produced by the incorrect specification of the conditional VaR model and derive its effect in the asymptotic distribution of the relevant out–of–sample tests. We also show that in the absence of estimation risk, the unconditional backtest is affected by model misspecification but the independence test is not. We propose using resampling methods to implement robust backtests. Our experiments suggest that block-bootstrap outperforms subsampling methods in size accuracy. We carry out a Monte Carlo study to see the importance of model risk in finite samples for location-scale models that are incorrectly specified but correct on "average ". An application to Dow–Jones Index shows the impact of correcting for model risk on backtesting procedures for different dynamic VaR models measuring risk exposure. (*JEL*: C52, C53, G32)

KEYWORDS: backtesting, Basel Accord, forecast evaluation, model risk, risk management, value at risk