



THE UNIVERSITY OF
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DEPARTMENT OF STATISTICS

Master's Thesis Presentation

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“Expected Shortfall Under Historical Simulation: A Monte Carlo Study
of Conditional and Unconditional Backtests”

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Abstract

Expected Shortfall (ES) has replaced Value-at-Risk as the main trading-book risk measure under the Basel FRTB regime, but practical backtesting tools for ES, especially for the Historical Simulation (HS) and Filtered Historical Simulation (FHS) models widely used in banks, are still being actively debated. This thesis provides an independent Monte Carlo replication of the ES backtests proposed by Du et al. (2024) for HS and FHS models. Using a range of data-generating processes that capture heavy tails, volatility clustering, nonlinear dynamics and structural breaks, this paper estimates HS and FHS ES forecasts at 5% and 2.5% levels, apply four tests from the same family (an unconditional ES test, a simple conditional test, and two data-driven conditional tests), and compare empirical rejection frequencies to the original results. The replication confirms that properly constructed conditional ES backtests, particularly the DP and DP-BIC procedures, offer substantial power gains over unconditional checks for misspecification.