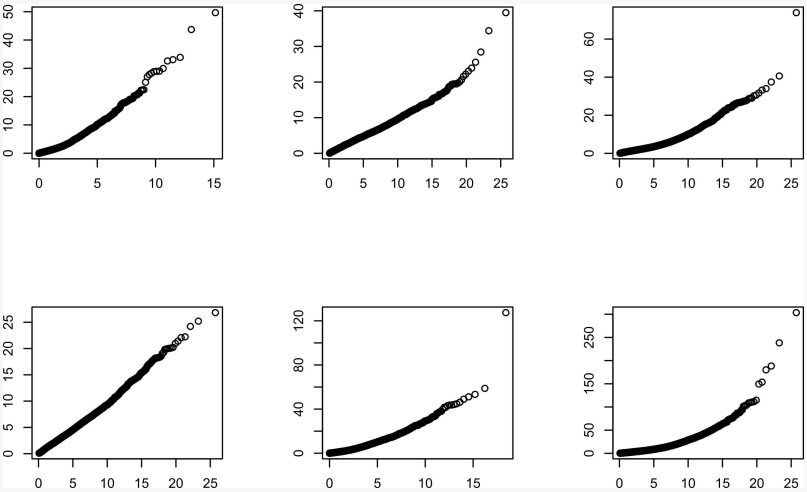
New backtests for improved expectile risk forecasts evaluation

GA, UNITED STATES, March 4, 2026 /EINPresswire.com/ -- Expectiles are a coherent and elicitable alternative to commonly used market risk measures, but practical backtesting tools have lagged behind. This study proposes new backtests that separate unconditional coverage from independence in expectile forecasts. By connecting a Wald-testing framework to Box–Pierce-style autocorrelation testing under a location-scale setting, the authors develop tests with improved finite-sample behavior in simulations and demonstrate their use on S&P 500 return data.



QQ plots of the empirical distributions of the six test statistics against their asymptotic chi-square distributions. Northwest: UC; North: IND1; Northeast: IND2; Southwest: IND3; South: NZ2; Southeast: IBP.

Financial institutions routinely forecast market risk, and regulators require those forecasts to be backtested—checked against what actually happens. Two widely used risk measures, Value-at-Risk (VaR) and Expected Shortfall (ES), come with well-known drawbacks: VaR is not coherent, and ES is not independently elicitable. Expectiles have attracted growing interest because they are "the only law-invariant risk measure that is both coherent and elicitable"; however, their backtesting has received less attention.

In a new study published in Risk Sciences, a team of researchers from Canada and the UK developed new backtesting approaches for expectile forecasts designed to address problems in existing methods, including size distortion and low test power. The central idea is to disentangle two properties that are often assessed separately for VaR/ES models: unconditional coverage (whether the forecasts are right on average) and independence (whether forecast errors show problematic time dependence).

"We wanted to introduce novel expectile backtests with better size and power properties," shares corresponding author Yang Lu. "For unconditional coverage, we used a simplified Wald-style test focusing on a single unconditional expectation condition to reduce distortion."

For independence, the team linked the general Wald-testing framework to the popular Box–Pierce lack-of-autocorrelation test, and—under a location-scale specification of returns—construct candidate i.i.d. sequences that allow Box–Pierce-style tests to be applied appropriately.

"Simulation studies indicated promising finite-sample performance for the proposed tests, and an empirical application illustrates how the approach can be used on S&P 500 return data," adds Lu. "Nonetheless, we noted that the independence-testing construction relies on a location-scale framework and may be less suitable under certain alternative data-generating mechanisms (e.g., stochastic volatility settings)."

References
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