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Spectral Backtests of Forecast Distributions with Application to Risk Management

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We study a class of backtests for forecast distributions in which the test statistic is a spectral transformation that weights excedance events by a function of the modelled probability level. The choice of the kernel function makes explicit the tester's priorities for model performance. The class of spectral backtests includes tests of unconditional coverage and tests of conditional coverage. We show how the class embeds a wide variety of backtests in the existing literature, and propose novel variants as well. We assess the size and power of the backtests in realistic sample sizes, and in particular demonstrate the tradeoff between power and specificity in validating quantile forecasts. Finally, we apply the tests to performance data from bank forecast distributions for trading book profit and loss.

This is joint work with Hsiao Yen Lok and Alexander J. McNeil.

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