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A max-correlation white noise test for weakly dependent time series

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Abstract

We propose a bootstrapped white noise test based on the maximum correlation for a time series that may be weakly dependent under the null hypothesis. The time series may be prefiltered residuals. Only uncorrelatedness is required under the null hypothesis, along with a moment contraction dependence property that includes mixing and non-mixing sequences. We show that Shao's (2011) dependent wild bootstrap is valid for a much larger class of processes than originally considered. Further, Escanciano and Lobato's (2009) automatic maximum lag selection is extended to our setting with an unbounded lag set that ensures a consistent white noise test. We show via Monte Carlo simulations that the proposed test has remarkably sharp size and high power in finite samples. In particular, the proposed test dominates the existing alternative when there exist serial correlations at remote lags. An empirical application on the weak form efficiency of stock markets is also presented at the seminar talk.

References

- [1] Escanciano, J. C. and I. N. Lobato (2009). An automatic portmanteau test for serial correlation. *Journal of Econometrics*, vol. 151, pp. 140-149.
- [2] Shao, X. (2011). A bootstrapped-assisted spectral test of white noise under unknown dependence. *Journal of Econometrics*, vol. 162, pp. 213-224.