Testing for Shifts in Mean with Monotonic Power against Multiple Structural Changes

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It is known that several widely used structural change tests have non-monotonic power, as explained by Vogelsang (1999). That is, the power initially rises under the alternative, but as the break magnitude increases, the power eventually falls and gets close to zero. This is because the long-run variance is over-estimated when the break magnitude is large.

In this paper, we develop an accurate long-run variance estimator to alleviate the non-monotonic power problem. We obtain a long-run variance estimator which is robust to large structural changes by modifying the method proposed by Juhl and Xiao (2009). We theoretically show that the tests with our long-run variance estimator have monotonic power against multiple structural changes, both asymptotically and in finite samples. Simulation results show that the proposed tests have monotonic power, while maintaining good size under the null hypothesis.

References

Juhl, T. and Z. Xiao (2009), "Tests for Changing Mean with Monotonic Power," *Journal of Econometrics* 148, 14-24.

Vogelsang, T. J. (1999), "Sources of Nonmonotonic Power when Testing for a Shift in Mean of a Dynamic Time Series," *Journal of Econometrics* 88, 283-299.