An improved confidence set for the break date of a single parameter

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Elliott and Müller (2007) and Kurozumi and Yamamoto (2015) proposed to construct a confidence set for the break date by inverting a structural break test. In this paper, we improve the confidence set by modifying the structural break test to be "one-sided". If we have prior knowledge about the direction of the break, the "one-sided" structural break test is more powerful than the conventional "two-sided" test, so that the length of the proposed confidence set is expected to be shorter.

When the break direction is unknown, we can consistently estimate the direction of the break if $T^{1/2}|\delta_T| \to \infty$ as $T \to \infty$, where δ_T is the magnitude of the break. Therefore, the proposed method can also be used in this case.

Simulation results show that the proposed method has good finite sample performance. Even when the direction of the break is unknown, the length of the proposed confidence set is shorter than that of the existing methods, while maintaining a good coverage rate.

References

[1] Elliott, G. and U. K. Müller (2007) "Confidence sets for the date of a single break in linear time series regressions," *Journal of Econometrics* 141, 1196–1218.

[2] Kurozumi, E. and Y. Yamamoto (2015) "Confidence sets for the break date based on optimal tests," *The Econometrics Journal* 18, 412–435.