We consider tests for multiple structural changes in linear regression models. The tests are based on F-type test statistics for the null hypothesis of no change against k changes or against an unknown number of changes with a given upper bound. We extend the existing results to linear regression models with deterministically trending regressors. Moreover, we introduce a generalized M-type test statistic which is based on functionals of weighted M-residuals. In change-point analysis approximations to critical values are usually obtained through the limit behavior of the respective test statistic under the null hypothesis. However, these approximations are often not satisfactory. Either the convergence of the test statistic to its limit distribution is rather slow or the limit distribution itself is very complex. An alternative approach is to apply resampling methods. We explore this possibility for F-type and M-type test statistics in the presence of multiple change points. We prove that the bootstrap method provides asymptotically correct critical values for the studied tests.

We conduct several simulation experiments to show that the bootstrap based approximations are reasonable also in nite sample situations. Moreover, these approximations are often better than the asymptotic critical values. Finally, we apply the studied methods to global temperature time series.