

**The smoots Package in R for Semiparametric Modeling of
Trend Stationary Time Series**

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Rebuttal letter

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Dear Editors and Reviewers,

We thank all persons who made valuable comments with regard to our initial submission. With this resubmission, we have considered all of the editors' and reviewers' remarks, have edited the paper correspondingly to address their criticism and provide detailed explanations of the changes implemented hereinafter.

We believe that the manuscript is now in a publishable state and hope that the editors and reviewers share our opinion.

Yours sincerely,



Dominik Schulz

On behalf of all authors.

To the Editor:

We thank the editor for giving us the opportunity to revise and resubmit our paper. We sincerely made every reasonable effort to address the reviewers' concerns. Therefore, the revised manuscript is now notably improved and is, from our point of view, suitable for publication. Nonetheless, we would be grateful for any additional criticism with regard to our work that could help us improve the manuscript, if any further concerns arose, and we would be pleased to have another chance at preparing and submitting a revised version.

Reviewer 1:

We acknowledge the reviewer's criticism and thank the reviewer for his/her advice. In the following, we comment on the aspects emphasized within the review and try to describe the changes made to the revised paper to account for the remarks.

I carefully read this manuscript and tested the performance of the R code. It should be stressed that this note treats very interesting topic. I have not found any mathematical error within the manuscript. Also entire R code is very functional and it is very well written.

We thank the reviewer and do not have anything to add to his/her introductory statement.

1. *I would like to see a strong motivation point by point why do we need such code.*

We completely agree with this statement. Therefore, a paragraph has been added to the introduction of the revised paper, in which R packages, that are related to the *smoots* package, are discussed and the novelty of the *smoots* package is highlighted. Thus, the relevance of the *smoots* package is now more apparent to readers of the paper.

2. *It would be very useful if the authors describe when this code can be applied i.e. to explain what does it mean "suitable time series".*

We respectfully disagree, as there appears to be a misunderstanding. Throughout the paper, the type of time series the *smoots* package can be applied to is mentioned on numerous occasions. The term „suitable time series“ is in fact stated both within the abstract and the introduction, however, it is clearly mentioned beforehand in both cases that the *smoots* package can be applied for data-driven local polynomial smoothing of trend-stationary time series, i.e. trend-stationary time series are suitable.

The authors should consider above comments before any recommendation.

As described, the comments have been carefully read and considered. We hope that the implemented adjustments as well as the given explanations are sufficient for a future recommendation.

Reviewer 2:

We thank the reviewer for the various valuable points made. Hereinafter, the reviewer's comments as well as brief responses from us can be found.

Assessment:

The paper provides an introduction to the smoots package. The paper is generally clear and well-written, but several parts should be improved or changed in my view (see main comments). My recommendation to the Editor is therefore a „revise-and-resubmit“ decision.

We fully agree. Furthermore, we acknowledge that some sections could benefit from adjustments (see the responses to the main and other comments).

Main comments:

1. *Add, to the introduction, a survey/comparison of related or similar R packages, so that it is clear for the user what kind of methods and features the package provides that are not already available in the R universe. One idea is to search, systematically, for packages with the keyword „smooth“ in their DESCRIPTION in the full list of packages at CRAN, https://cran.r-project.org/web/packages/available_packages_by_name.html, and then to include into the survey those packages that are relevant/comparable.*

We concur. Thus, the introduction of the paper has been revised. It now includes a survey of the R packages related to the *smoots* package. Consequently, the features of the *smoots* package newly introduced to the R universe are also highlighted.

2. *Throughout the paper, the code used is not explicit in a fully re-producible way. Instead, it is contained in the Appendix. This, in my view, is inconvenient. It is better to provide the code as part of the text in, say, a verbatim or code environment.*

We agree. The code has been removed from the Appendix and inserted into the corresponding passages from the text in respective code environments.

3. *Paragraphs 2 and 3 under the heading „Practical implementation in R“ are somewhat messy and difficult to read. This is partly related to my previous bullet-point. Please re-arrange and/or re-write. Use bullet points or similar? Write the code explicitly in verbatim or code environment to make the code explicit?*

We admit that the section „Practical implementation in R“ is difficult to read. Thus, the main data-driven functions of the *smoots* package and their function arguments are now explained in a more structured way, i.e. each function argument is explained in a separate bullet point to avoid confusion. As in the first submission of the paper, code is stated explicitly in a code environment.

4. *I recommend that you do not use ggplot2 for the plotting unless absolutely necessary. After all, the main objective of the package is to provide an introduction to the *smoots* package, not ggplot2. I was unable to make the ggplot2 code work without problems under my configuration of R and package versions, which unfortunately happens all too often with packages from the RStudio people. Also, you need a lot of code to produce the plots via ggplot2. With all that code, you could just as well use base R and the basic infrastructure provided by the *ts-class*. Alternatively, another robust and more general approach to time-series in R is provided by the *zoo*-package, and its cousin the *xts*-package.*

We sincerely apologize that the graphics could not be reproduced. As proposed by the reviewer, all graphics have been recreated using base R and should therefore now be completely reproducible.

Other:

1. *On p. 1 in the second paragraph of the introduction, the ARMA-approach to the estimation of log-GARCH model is mentioned. You may want to cite the survey paper/chapter by [Sucarrat \(2019\)](#), or some of the references therein.*

We accept the advice. The proposed chapter is now cited in the paper.

2. *In examples 3 and 4, that is, in the Sections entitled „The Semi-Log-GARCH model" and „The Semi-Log-ACD model", respectively, it could be an idea to explicitly adopt the three-step estimation procedure suggested in Section 3.3 in [Sucarrat \(2019\)](#), which is from [Escribano and Sucarrat \(2018, pp. 289-290\)](#). It appears to me that this would make the exposition easier to follow for the reader. The implication of the three step procedure is that, while an estimate of $E(\ln \eta_t^2)$ is needed for an estimate of the conditional variance (or conditional mean in the log-ACD case), an estimate of ω is not needed. It can be skipped, so estimation is simplified. Of course, if an estimate of ω is of interest, then it can be estimated subsequently.*

We greatly appreciate the suggestion for improving the exposition in examples 3 and 4. Therefore, as proposed by the reviewer, the three-step estimation procedure in Sucarrat (2019) is now explicitly adopted and stated in the paper. Furthermore, the code for examples 3 and 4, which has been inserted into the text as previously mentioned, has been adjusted to outline the three-step procedure more clearly.

References

Escribano, _A. and G. Sucarrat (2018). Equation-by-Equation Estimation of Multivariate Periodic Electricity Price Volatility. *Energy Economics* 74, 287-298.

Sucarrat, G. (2019). The Log-GARCH Model via ARMA Representations. In J. Chevallier, S. Goutte, D. Guerreiro, S. Saglio and B. Sanhadji (eds.): *Financial Mathematics, Volatility and Covariance Modelling*, Volume 2. Working Paper version: <https://mpira.ub.uni-muenchen.de/id/eprint/100386>.