Fw: Journal of Business & Economic Statistics - Decision on Manuscript ID JBES-P-2022-0567

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An

Michael Vogt

From: Journal of Business & Economic Statistics <onbehalfof@manuscriptcentral.com>
Sent: Tuesday, January 31, 2023 2:43 AM
To: Marina Khismatullina <khismatullina@ese.eur.nl>
Subject: Journal of Business & Economic Statistics - Decision on Manuscript ID JBES-P-2022-0567

30-Jan-2023

Dear Dr. Khismatullina,

I have now heard from the Associate Editor (AE) regarding your manuscript, "Multiscale comparison of nonparametric trend curves" [Paper JBES-P-2022-0567], that you submitted to the Journal of Business & Economic Statistics. Referee 2's report is attached to this email, and the AE and referee 1's reports appear at the bottom of this message.

The reviewers have diversified opinions, and they raise many issues. Although I think you can address many of them, there is one main issue I don't see how to handle: As the AE points out, you do not have a compelling case for the null hypothesis that time trends are identical across multiple time series. Like the AE, I can't think of different economic time series sharing the same trend. I appreciate your discussions on clustering much more, but the same issue arises within a group.

There is a small econometric literature on co-trending and co-breaking where common time trends and breaks are used to capture comovements of multiple time series. Rather than time trends being identical, they are proportional to each other. That might be more plausible for modeling multiple economic time series. Because this may not be difficult in your framework, I do not mean to impose it. Instead, I am pointing out that such literature may or may not be helpful.

Although I doubt the plausibility and usefulness of the null hypothesis, I would like to give the benefit of the doubt. I am willing to consider a revision of your paper, though with no guarantee that it will ultimately be accepted. I ask you to address all of the reviewers' concerns. Most importantly, please make a much more compelling and convincing case for the null hypothesis, which may be very difficult. I should note that this is not a typical R&R and is a rather weak R&R.

The Journal of Business & Economic Statistics has a policy that after the first round of revisions, papers must be either rejected or accepted subject to specific minor revisions. This makes the next round very important, particularly with the significant revisions needed for your paper. To have a chance at publication, the revised paper must address the concerns raised by the reviewers. Finally, I would ask that the revised version of the paper does not exceed 35 pages (as currently formatted).

If you decide to submit a revision, when uploading your response file, please choose the "Author Response to Reviewers" file designation from the drop-down menu. Please be sure to "blind" your

response.

Your paper might be rejected if we do not receive a revised manuscript by 25-Jan-2024. Also, note that before a paper can be published, it will need to conform to the ASA and JBES style and formatting requirements. These requirements include no footnotes, double-spacing your paper, no color figures, and an acknowledgments section.

To submit a revision, please click on the link below:

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IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Regardless of whether you decide to resubmit, I would like to thank you for sending your work to the Journal of Business & Economic Statistics.

Sincerely,

Atsushi Inoue

Editor, Journal of Business & Economic Statistics
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Reviewer(s)' Comments to Author(s):

Reviewer: 1

Comments to the Author
Review of JBES-P-2022-0567: "Multiscale comparison of nonparametric trend curves"

The manuscript considers the problem of testing whether or not multiple time trends are identical (after adjusting for covariates), and if not, which of the series are different, and when. The methodology uses a multiscale testing procedure that enables both global and local (e.g, a specific series at a specific time interval) testing while controlling the FWER. Simulation studies and an economic application are included.

- The assumptions and requirements for the variance σ^2 deserve further consideration. First, it is claimed that the variances are assumed to be constant across series, but that a different estimator is used for each series. Which is the correct assumption for practice and theory? Second, given the economic and potential financial applications, how might volatility (or time-varying variance) be incorporated into the testing procedure? Is this plausible within the proposed framework, even if additional assumptions are required? If it is not plausible to account for volatility explicitly, then is the procedure robust in the presence of volatility?

- There are several issues with the simulation study. First, setting the fixed effect to zero and including a single covariate both make for a much simpler design than considered in the theory. More challenging scenarios, including nonzero fixed effects and multiple predictors (e.g., using the estimated values and/or covariates from the application) would better demonstrate the capabilities of this approach. Second, the data from the null fix $m_i = 0$ and claim this is WLOG. However, this is also quite a simple case: the shared $m_i()$ curve could be quite complex under the null, which only maintains that the trends are shared among the series. Third, there are no competing methods considered; some alternative approach or benchmark must be added. A reasonable alternative might consider an additive model and compute confidence intervals (or bands) for the trends, with a simple heuristic to determine whether the functions are identical. The proposed approach should do better, but demonstrating improvements over a reasonable alternative is important. Finally, only a small number of series is considered. How does the approach perform when n is large?

- Similarly, there are many related clustering methods, including (Bayesian and non-Bayesian) methods for clustering functional data. The proposed approach is reasonable, yet should be placed in a broader context and evaluated against appropriate competitors.

- A related Bayesian strategy is to use simultaneous band scores (simBaS) to assess whether a function differs from zero. This could be applied pairwise to the differences between functions to establish a Bayesian competitor to the proposed approach, and simply requires posterior draws from an analogous Bayesian model.

- The application includes numerous tuning parameters (including kernels, intervals, etc.). Are the results robust to these choices? Further details are needed.

- The multiscale tests are designed to control the FWER. Why is that the right criterion for the types of applications in mind (compared to e.g., FDR)? Given that other reasonable choices exist, additional motivation for this objective is warranted.

- I'm wondering if there might be some clarification about the independence of ϵ_{it} across series i. In particular, suppose the intercepts α_i were instead considered random, like in mixed modeling (or Bayesian inference). Then marginally, the "new" errors ($\alpha_i + \epsilon_{it}$) would be dependent across series i. Similar reasoning might apply to the covariates. From this perspective, the class of models might be considered more general.

- it is claimed on p. 6 that the mean function integrating to zero is "required" for identification of the intercept. I think this is a sufficient, not necessary, condition, since others might suffice.

Editor's Comments to Author(s):

Associate Editor
Comments to the Author:
The less enthusiastic referee wrote: "Perhaps it is my unfamiliarity with the problem (or my tendencies toward Bayesian methodologies…), but I do not find it to be a particularly compelling research question. The goal is to test whether a time trend—after adjusting for covariates—is identical across multiple time series. This does not seem to be a high priority for multiple time series and dynamic regression analysis, and it's not clear whether a hypothesis test generates much useful information in this context." This is a comment I broadly agree with: would one really want/need to test for the exact "sameness" of time series trends? Or is it the case that the null hypothesis is uninteresting, but the alternative is, especially if I am able to see which trends are different and where? I am thinking aloud here, but overall I don't think the testing problem, as stated, is interesting enough for JBES readers.

My other comments:

- There are two prior papers by the submitting author, which consider a similar problem but in the absence of external covariates. I don't think the current paper makes it clear early enough what is different between the current work and those earlier papers.

- Due to the various approximations, the size control is only approximate. I don't see it as a "state of the art" way of thinking in these types of FWER control problems; please see e.g. https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Farxiv.org%2Fabs%2F2009.05431&data=05%7C01%7Ckhismatullina%40ese.eur.nl%7C50d95c1e1f0a4457a05308db032c83df%7C715902d6f63e4b8d929b4bb170bad492%7C0%7C0%7C638107262472393751%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=CsgvA%2BOk5OvJOb1jQ8S9PbqoKcXpqMy%2FWq4rsi9Gu3c%3D&reserved=0, where size control, in a different but related multiscale testing problem, is exact.

- I suspect the procedure must be really difficult to use in practice with confidence, as it depends on so many tuning parameters including the bandwidth. The authors say their software is at https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgithub.com%2Fmarina-khi%2Fmultiscale_inference&data=05%7C01%7Ckhismatullina%40ese.eur.nl%7C50d95c1e1f0a4457a05308db032c83df%7C715902d6f63e4b8d929b4bb170bad492%7C0%7C0%7C638107262472393751%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=jrvU%2BI2Q7QeN8uJ%2BVn7RJNONtLR%2BpJY2bp%2BfR8Kjt0Y%3D&reserved=0, but the link is broken.

- Both referees, including the more enthusiastic one, mention several further issues with the paper, including issues related to the practicalities of the method, the simulation study and the asymptotic nature of the method.

JBES-P-2022-0567-report.pdf

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