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Reviewer's report on the habilitation thesis "Dynamic Score-Driven Models, An R Package with Applications" written by Mgr. Vladimír Holý, Ph.D.

The thesis under review is a collection of eight academic papers that consider different applications of dynamic score-driven models. The dynamic score-driven models, also commonly known as generalised autoregressive score models, are a class of time series models in which the parameters evolve dynamically over time based on the score (gradient) of the likelihood. The core idea that the score provides an optimal update mechanism for parameter evolution, ensuring flexibility while maintaining statistical efficiency, is attractive, and hence we see a surge in literature using these models, despite the lack of proper theoretical properties of such an estimation approach. In contrast to other econometric frameworks, the approach is therefore attractive due to its flexibility and is mainly used to provide generalised structures, including a variety of distributions, parameter dynamics, and even time-varying probabilities in state-space models, making them useful for diverse applications. This is also the case of the majority of papers included in the thesis, which is generally well written and its contribution lies in several applications. While the majority of the papers have been published in good-level field journals that consider such applications and have therefore gone through the refereeing process, I will look more at the general overview of the content. At the same time, the candidate's contribution is unclear and I suggest that they clearly state how they have contributed to the papers co-authored by colleagues.

In general, while I am sympathetic to dynamic score-driven models and their applications, the majority of the work is focused on applications and it would be good to highlight the main questions that this research addresses. For example, I personally find the introduction of score-driven models for dynamically ranked data interesting, as this literature is limited. I also find it interesting to look at the question of team performance in sports competitions such as ice hockey, or modelling price clustering, I just think this needs to be more clearly articulated in a number of places, and perhaps I am missing an overall summary of the work that would clearly state the contributions the author makes to the literature, as I believe a mere application is not the main purpose or the proper research question. Without such a clear discussion it is also hard to see the value and usefulness of the work. The author also introduces an R package that can potentially be useful for educational purposes in courses taught, although a number of packages have been developed and it is not entirely clear how this particular package contributes and why users should use it.

While I enjoyed reading the thesis and appreciate its content as an econometrician, I often wondered whether a more general reader interested in economics would welcome a broader motivation of the work. Therefore, I suggest that the author focus his discussion on the potential broader usefulness of the work for economic research or practitioners.

In conclusion, the majority of the papers contribute to a narrow technical literature that looks at some question through the lens of score-driven models and can be useful for educational purposes. I recommend that the thesis be considered by the Scientific Council as a habilitation thesis.

Sincerely yours,

Jozef Baruník