Referee report for ECOSTA-D-22-00151R1

"A Computationally Efficient Mixture Innovation Model for Time-Varying Parameter Regressions"

The manuscript provides nice and useful contributions to the TVP literature. Some issues remain:

1. The advertisement of $\mathcal{O}(n)$ scalability instead of $\mathcal{O}(2^K n)$ is still unsatisfactory. There are many sampling strategies for Bayesian linear regression models, and proper comparisons among them must acknowledge dependence on both n and K. The sampler requires drawing all $d_{j,t}$ for $j = 1, \ldots, K$ and $t = 1, \ldots, n$; reporting the correct dependence on K will still favor the proposed approach, but will not mislead the reader. This should be modified throughout the manuscript.

2. As pointed out previously, spike-and-slab models commonly update one indicator at a time using stochastic search (see e.g., the Hoff textbook). It is claimed that this method loses sampling efficiency. That may be true, but it is important to show the practical implications in the empirical analyses. This competing method should be added to all comparisons; I expect it will further bolster the advantages of the proposed approach.

3. Similarly, it is claimed that a restricted version of the model (RMI) must be used for scalability. Again, the one-at-a-time update is computationally feasible and provides an "exact" implementation of the MI model. This comparison should be included.

4. It was previously suggested to include a Bayesian linear regression model for benchmark comparisons. However, only a single point estimate is included on some figures, rather than any model evaluations (e.g., log-predictive scores), and it is unclear what is meant only by "static regression". The `bayeslm` package provides fast and easy implementation of a linear regression model with a horseshoe prior, which would be most appropriate for comparisons.

5. Will code or software be released with the paper?