Discussion of "A Randomized Missing Data Approach to Robust Filtering and Forecasting"

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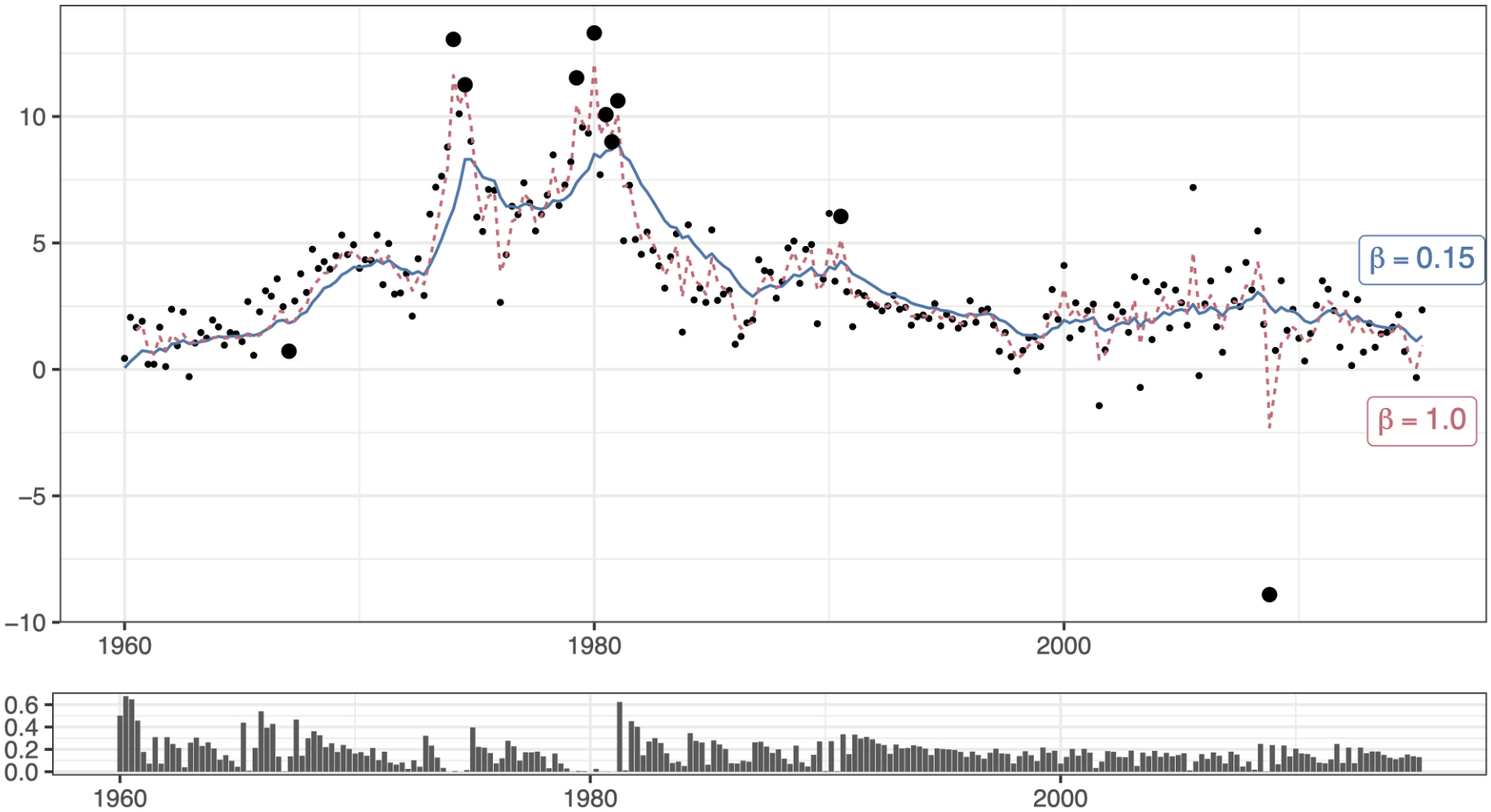
Overview

- **Key Idea:** Use a randomized missing data approach (RMD) to allow for imprecise measurement or model misspecification in state space models.
- Randomization parameter $\beta \in [0, 1]$ is similar to a regularization parameter: $\beta = 1$ corresponds to including all measurement as if correctly specified, $\beta = 0$ corresponds to no inclusion of data at all.
- Lower β leads to higher variance but potentially less bias under misspecification.
- Two main versions:
  1. Endogenous (RMD-N) - learning about data imperfections
  2. Exogenous (RMD-X) - no learning about data imperfections
- Successful forecasting performance in an unobvserved components (UC) framework applied to inflation data as in Stock and Watson (2007,2016).

Comment 1: Heavy-Tailed Models and Misspecification

- I do not fully understand and appreciate the advantages of RMD over heavy-tailed observations + stochastic volatility, e.g. UCSVO in Stock and Watson (2016) and MUCSVO in Antolin-Diaz et al (2021)
- What type of misspecification does RMD better protect against that heavy-tailed measurement error and stochastic volatility do not? An illustrative simulation exercise and further discussion could go a long way.
- Should I think of RMD as a complement or a replacement? What happens when you combine it with the UCSVO model in the inflation application? Is there evidence that $\beta < 1$?

Comment 2: Forecasting vs. Measurement



Comment 2: Forecasting vs. Measurement

- How do the filtered estimates of inflation compare between different models, i.e. the UCSVO model?
- How do **smoothed** estimates compare between different models and different values of β?
- This would help get at whether RMD is helpful more for real-time inference such as nowcasting and forecasting, for measurement, or for both.

Comment 3: Computational Complexity and Scalability

- What is the computational burden of adding RMD on top of UC and UCSVO models (or any state space model for that matter) for both RMD-X and RMD-N?
- Can RMD be scaled to higher-dimensional models such as multivariate dynamic factor models popular in macro nowcasting/forecasting?
- Is there a “curse of dimensionality"?

Comment 4: Robustness and Interpretation of β

- The authors mention that $\hat{\beta}$ can be chosen to minimize any criterion, not just MSFE.
- How different are the estimates of $\hat{\beta}$ are when using other symmetric loss functions or log-forecasting density in the inflation example?
- There are comparisons to rational inattention and penalization in the machine learning literature. How should I interpret estimates $\hat{\beta}$ through those lenses?
- Is there some type of direct comparison to an information cost parameter from a rational inattention model, or is this more informal?

Comment 5: Real-Time Data

- Does the out-of-sample forecasting exercise for inflation use real-time data? I did not see the data discussed in detail.

- Perhaps it will not make a big difference to the results but it seems important if you want to use MSFE or other measures of forecasting performance as a metric for choosing β in real time.