EUROPEAN CENTRAL BANK

EUROSYSTEM

Learning from crises: a new class of time-varying parameter VAR with observable observations

N. Hardy and D. Korobilis

24/03/2026

Discussion by Claudia Foroni
European Central Bank

Paper contribution in a nutshell

Adaptively-varying parameter (AVP) VAR

- Key insight: it links parameter variation to observable economic drivers
- Structural change is central in forecasting
- Traditional TVP-VARs rely on latent stochastic processes: impose gradual drift on the parameters → poorly capture abrupt shocks
- Proposal: AVP-VAR: $\beta_t = f(Z_t)$, where Z_t are observable drivers
- (My) Interpretation: time variation closer to adaptation than filtering

Advantages of AVP-VAR

- Econometric implications:
  - Reduces complexity
  - Avoid state-space and particle/Kalman filtering
  - Less sensitivity to prior specification and overfitting

- Forecasting performance:
  - Competitive or superior out-of-sample forecasting performance
  - Larger gains in “crises”

Choice of drivers

- Critical choice: how to choose drivers Z_t
  - Are observable drivers sufficient to span structural changes?
    - If important drivers are omitted, what happens to the model performance?
    - If irrelevant drivers are included, what happens to the model performance?
  - Drivers simplify (see advantages of AVP-VARs), but also impose restrictions
    - If structural change is partly driven by unobserved shifts, does restricting drift to observable drivers introduce systematic bias?

Choice of drivers

- More on… how to choose drivers Z_t
  - Is there any issue of endogeneity and measurement error?
  - Are selected drivers stable across subsamples?
  - If we need priors to select Z_t aren't we back to the sensitivity to prior specification?
- Overall, is there any criteria which could drive the choice of Z_t?
- Could AI/ML help select the relevant drivers?
- More simulations to help answering those questions welcome!

Choice of function

- Critical choice: $\mathrm{f}(Z_t)$
  - Drivers might be different in crises and normal times.
  - What if $\mathrm{f}(Z_t)$ is non-linear?

  - Is $\mathrm{f}(Z_t)$ economically interpretable?

- Possible extensions: can this be integrated on deep learning frameworks?

Other comments

- (Number of) factors
  - What drives the number of factors to use?
  - Do we need factors at all? Disentangle forecast improvements driven by factors and by the drivers

- Forecasting
  - Direct forecasts when $h \geq 1$: no need to forecast Z_t. But shouldn't $\beta_{i,t+h}$ and $\lambda_{i,t+h}$ be h –specific?
  - Extension: what about timely (higher frequency) indicators?

- Dimension of the VAR
  - Does your method work on large scale VARs?