Discussion of
Real-time Prediction with UK Monetary Aggregates in the Presence of Model Uncertainty
by Garrat, Koop, Mise, Vahey

Marek Jarociński
European Central Bank, DG-Research

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Overview of the paper

Popular knowledge:
UK abandoned monetary targeting because weak predictive relationship between M and Y,P became apparent in the 1980.

→ This paper: study predictive content of M for Y,P

Finding: mixed/unstable evidence on M’s predictive content, especially when properly taking into account real time data

Out of sample: M systematically biases forecasts ← underexploited in the paper!
Methodology

VAR/VECM
Granger causality tests
+ out-of-sample forecast comparison with/without M
→ Amato and Swanson (2001)

New, realistic feature: model uncertainty (Bayesian Model Averaging)
+ Bayesian look at forecast comparison
Computing probabilities on average over models

- 40 VAR/VECM specifications (differences: number lags, number of cointegrating vectors)
- each specification in two varieties: with M, and without M (coefficients restricted to 0)
- ⇒ total model space: 80 VAR/VECM’s
- approximate Bayesian result: posterior probability $\propto \exp(BIC)$
- What is the posterior probability that M is out? average over specifications: = what is the posterior weight of all models without M as a share of all model space:
Example

Suppose total model space is 4: specifications 1 and 2, R(estricted) and U(nrestricted)
examples of probabilities:

\[
P(R|1) = \frac{eBIC_1^R}{eBIC_1^R + eBIC_1^U}
\]

\[
P(U1|U) = \frac{eBIC_1^U}{eBIC_1^U + eBIC_2^U}
\]

\[
P(1) = P(1|all) = \frac{eBIC_1^U + eBIC_1^R}{eBIC_1^U + eBIC_1^R + eBIC_2^U + eBIC_2^R}
\]
Posterior probability of R on average across models:

\[ P(R|1) \times P(U1|U) + P(R|2) \times P(U2|U) =? \]  \hspace{1cm} (1)

\[ P(R|1) \times P(R1|R) + P(R|2) \times P(R2|R) =? \]  \hspace{1cm} (2)

correct:

\[ P(R|1) \times P(1|all) + P(R|2) \times P(2|all) = P(R|all) = P(R) \]  \hspace{1cm} (3)
Numerical example

|       | \( P(R|1) \) | \( P(1) \) | \( P(R|2) \) | \( P(2) \) | \( P(R) \) |
|-------|--------------|------------|--------------|------------|-----------|
| by U  | 0.67         | 0.50       | 0.20         | 0.50       | 0.43      |
| by R  | 0.67         | 0.89       | 0.20         | 0.11       | 0.61      |
| correct | 0.67     | 0.71       | 0.20         | 0.29       | 0.53      |
Comment on the instability

Instability of model weights: typical finding

model probability $\propto \exp(\log L - K/2 \ln T)$

$\approx \frac{SSE^{-T/2} \times T^{-K/2}}{T}$

$\rightarrow p(M|Data) \propto p(Data|M) \times p(M)$ - value of T-dim density, badly behaved

in the context of growth regressions:
Ciccone, Jarocinski (2007), Determinants of Economic Growth: Will Data Tell?

potential remedies: shrinkage priors, explicit modeling of measurement errors, Zellner’s quality adjusted likelihood
results are conditional on the space of models: VAR/VECM’s with
- 1 to 8 lags
- 0 to 4 cointegrating vectors
Is the model space interesting? Are these VARs good forecasting models?
no evidence on forecasting performance compared to other models (e.g. univariate)

- most probability on low number of lags
  \( \Rightarrow \text{unrestricted VARs are heavily overparametrized!} \)
- ’we do not attempt an economic interpretation of the number of cointegrating relationships’ - so why bother distinguishing these cases?
Missing important alternative model

encompassing model: VAR in levels + shrinkage prior (Minnesota prior)

- much better for forecasting
- nests models with shorter lags, nests reduced rank - cointegrating relationships
- if included in the BMA, it will dominate other models!
  "Lindley’s paradox": flat prior = negligible model weight
- its results will fluctuate less across subsamples!

Shrinking vs BMA: see Jarocinski (2007) Shrinking growth regressions
Out of sample exercise:

- forecasting models are for h steps ahead regressions
- model weights are for one step ahead regressions
- predictive density should weigh h-steps ahead models by their own weights
Summary

- interesting new evidence on the predictive content of money in the UK
- real time issues taken into account
- model space - crucial; room for improvement?
- previous literature: focus on statistical significance; still unexploited: economic significance; fig. 5-6!