

Bayesian Variable Selection for Nowcasting Economic Time Series Scott and Varian

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Discussant's nightmare?

- Interesting problem, clearly articulated
- Solution well-presented with good examples
- Authors have more technical skill and know-how than I do
- => so it is difficult to find something to say!

Brief summary

- Problem: forecasting with many (potential) predictors
- Solution: a series of estimation techniques
 - Pre-whiten y and x 's? or include directly in model?
 - Use a Bayesian estimation technique for choosing x 's that places low probability of inclusion on some, and a normal distribution on those included
 - Estimate with Gibbs sampler using MCMC techniques, which tends to sample models that are likely given the data, rather than all possible models
 - Average over many solutions to get preferred model
 - One-step ahead forecast using only data for t and queries at $t+1$ (nowcasting)

Comments(1)

- When forecasting, concerns are different from those we worry about when doing econometric modeling and hypothesis testing:
 - Causality not as important (except perhaps for choosing priors),
 - We are estimating a conditional expectation, not a causal regression
 - What matters is ability to forecast using only data prior to forecast period
 - Evaluation is by forecast error, not necessarily goodness of fit
- Challenge to researcher – many choices to be made

Comments and queries

- Slides are clearer than the paper on the exact method of estimation – would be nice to have the exact Bayesian updating formula
- Compare some models as in Brynjolfsson & Wu
- Do we need fat regression techniques?
- What happens if you do true step-ahead forecasting (don't use any data after time t)?
 - Related - does the Kalman filter settle down after some time period? (that is, updating places little weight on new obs) – can we answer this in the case with Bayesian averaging for regressors?

Minor points

- References to “trend” are sometimes confusing - deterministic or stochastic?
 - E.g., Removing a linear trend in X raises econometric questions
 - Prediction is based on model conditional on X
 - But if we remove a trend in X , it is now contaminated by future observations (if not strictly exogenous)
- What is MAE? Mean absolute error? – but given that all likelihoods are based on second moments, wouldn't MSE be more appropriate?
- Interesting that BSTS picks a search term that does not have highest correlation with dep var – how to understand?
- Noise

Extensions

- Betas as state variables?
- Fat tails – important consideration for forecasting
 - But increases complexity since the normality assumption makes Bayesian estimation much simpler
- Economic data like GDP often subject to revisions ex post
 - Could nowcasting help to improve the current estimate of such figures before revision?

Useful refs

- George, E. I. and R. E. McCulloch (1993). Variable selection via Gibbs sampling, *JASA* 88 (423): 881-889.
- Madigan, D. and A. E. Raftery (1994). Model selection and accounting for model uncertainty in graphical models using Occam's Window, *JASA* 89 (428): 1535-1546.
- George, E. I. and R. E. McCulloch (1997). Approaches for Bayesian variable selection, *Statistica Sinica* 7: 339-373.
- Commander J. J. F. and S. J. Koopman (2007). *An Introduction to State Space Time Series Analysis*. Oxford University Press.