



DSGE Forecasting and Uncertain Instabilities

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Introduction

CB Modelling Strategies

DSGE Development and UI

NB Nowcasting Experience

BATMAN

Forecasting in Norway

The Shape of Future NB System

Conclusions

The Issue

- ▶ Model uncertainty now receives substantial attention in macro, eg Forthcoming JAE Special Issue (ed Durlauf and Vahey)
- ▶ Renewed emphasis on:
 - ▶ Model selection/comparison, and summarising across specifications
 - ▶ Evaluation of policy in presence of model uncertainty



Uncertain Instabilities (UI)

- ▶ Central role of UI forecasting applications
- ▶ Difficult to estimate break dates with real-time data errors and short samples
- ▶ Research agenda focus on forecast accuracy with UI



Some Common CB Modelling Approaches

- ▶ Calibrated DSGE, no breaks, no tvp, eg RBNZ FPS
- ▶ VARs, no breaks
- ▶ Factor models, no breaks; see Giannone et al (2007, JME)

No Breaks, Then Certain Instabilities?

- ▶ Bayesian VARs, perhaps really big; see Banbura et al (2008, JAE)
- ▶ Bayesian DSGE
- ▶ Bayesian VARs with TVP, then perhaps coming soon, DSGE with TVP ...



Common Elements in the Rise of CB DSGE Projects

- ▶ Forecasting performance of previous generation core model unconvincing
- ▶ Previous generation models too detailed for client (decision maker, DM)
- ▶ Need to build human capital

UI Implications for DSGEs

- ▶ No constant parameter DSGE model can be even approximately correct
- ▶ Optimal policy based on one DSGE model, may not be for other (quite-likely) specifications; see Onatski and Williams (2008)
- ▶ Don't expect DSGEs to forecast well at short horizons—take nowcasting very seriously

Taking Nowcasting Seriously

- ▶ Recent history suggests central banks augment core DSGE modeling by adding more rigor to nowcasting
- ▶ Examples include: Norges Bank, BOE, Sveriges Riksbank and RBNZ
- ▶ Typically aim is not to replace DSGE project, but to supplement it



Benefits From Nowcasting Research

- ▶ Draws on empirical human capital built during DSGE modeling project
- ▶ Mitigates risk of research team becoming to “model-centric”
- ▶ Focus attention on short-term forecasting performance: a key component of monetary credibility

BAYesian Time(-series) Model Average Nowcasting System

- ▶ BATMAN System—someone who serves the officer (DM), a military butler
- ▶ Expert combination via (Linear Opinion) Pool
- ▶ Bayesian interpretation: a form of Bayesian Model Averaging



BATMAN System

- ▶ Given $i = 1, \dots, N$ Experts, convex combination:

$$p_{\tau}(y_{\tau,h}) = \sum_{i=1}^N w_{i,\tau,h} g(y_{\tau,h} \mid I_{i,\tau}), \quad \tau = \underline{\tau}, \dots, \bar{\tau} \quad (1)$$

- ▶ where $g(y_{\tau,h} \mid I_{i,\tau})$ are h-step ahead forecast densities conditional on information set I_{τ}



BATMAN System Details

- ▶ Publication delay in production of data ensures that information set contains macroeconomic variables dated $\tau - 1$ and earlier
- ▶ Each individual Expert produces h -step ahead forecasts via the direct approach
- ▶ The macro variables used to produce an h -step ahead forecast density for τ are dated $\tau - 1 - h$



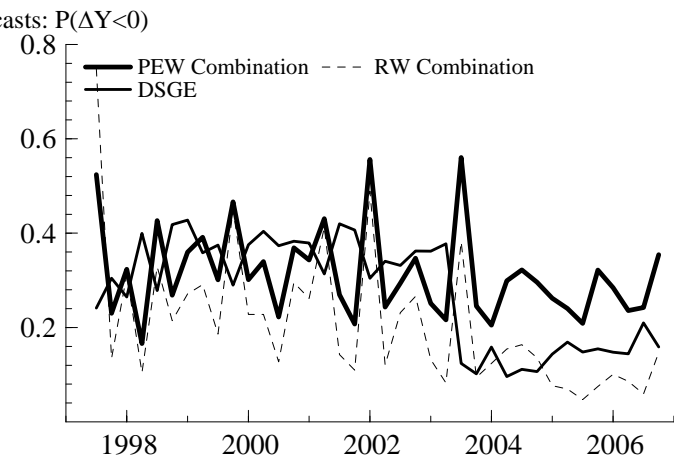
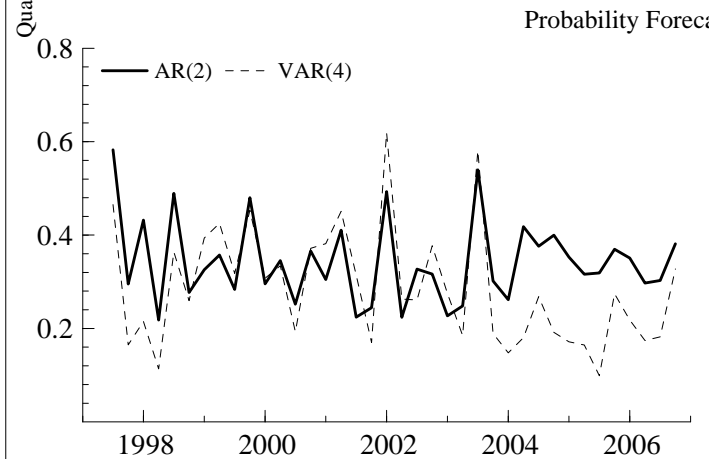
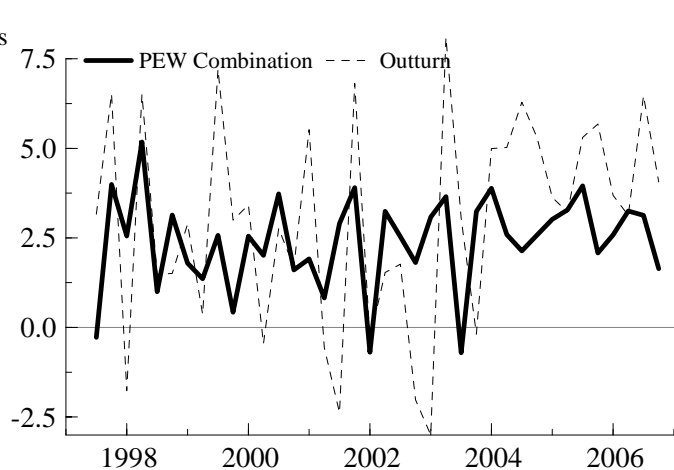
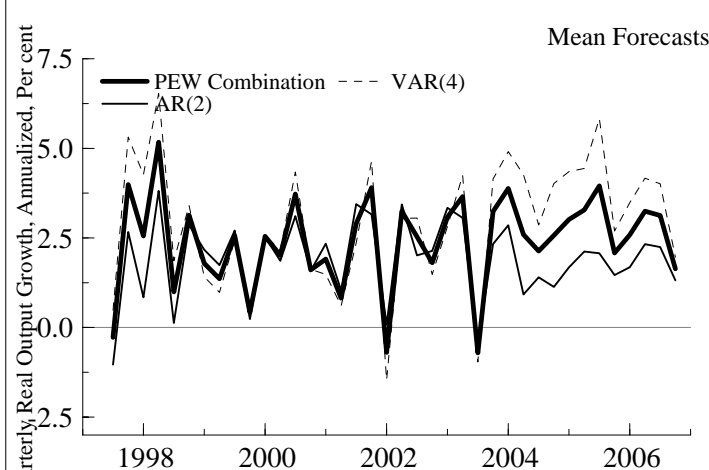
BATMAN System Recursive Weights

- ▶ To weight predictive densities use:
- ▶ Logarithmic score (Amisano and Giacomini, 2007, JBES), Hall and Mitchell (2005, Ox Bull)
- ▶ Information criteria eg BIC, AIC (Kapetanios et al, 2007, JBES)
- ▶ RMSFE (Andersson and Lof at Riksbank)



Forecasting from Norwegian VARs and DSGE

- ▶ VARs and DSGE (approx NEMO)
- ▶ DSGE low weight for most recursions 1997Q3 to 2006Q4
- ▶ DSGE densities too wide typically—similar findings for NZ (Lees, Mitchell and Vahey, 2007) and Aussie (Gerard and Nimark, 2008)



h=0	GDP
AR	0.0003
AR(rolling)	0.0000
VAR	0.0034
VAR (rolling)	0.1925
DVAR	0.001
DVAR(rolling)	0.0035
Inf. Detrend	0.0072
Inf. Detrend (rolling)	0.2511
BiVAR	0.0032
BiVAR rolling	0.5385
DSGE	0.0000



BATMAN's Components

- ▶ ARs, factor models, VARs, BiVARs, TVP-BVARs
- ▶ DSGE policy model(s)
- ▶ Judgement and timely survey data



NB Project Overview, Phase III

- ▶ September 2008 to July 2009, implementation
- ▶ Implement “front-end” suitable for regular policy use by non-specialists
- ▶ Prepare for future external evaluation of Norges Bank modeling, (Nowcasting plus DSGE, NEMO)



Conclusions

- ▶ Unknown instabilities literature suggests need for model diversity
- ▶ Many central banks find that nowcasting project provides an avenue to explore DSGE and UI
- ▶ The NB experience will be watched carefully by other central banks