Short-range Forecasting Tools at the Riksbank

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Ambition of the Talk

- To describe the forecast procedure at the Riksbank
- To explain the role of the Riksbank's models
- To explain briefly the used models

Agenda

1. BRASSE - an automatic short-range forecast package
2. The Reverse PAC
3. Meetings
4. Demonstrations

BRASSE
A Broad Regression Assessment System for the Swedish Economy

- An automatic execution of a large number of specifications.
- Large data set.
- Two serial lengths allowed
- One target variable (common for all models)
- Conditional forecasts and control for (possibly) desired steady state

BRASSE
Elements of BRASSE

- Bivariate classic VARs - all series at the short length
- Multivariate classic VARs - 50 "best indicators" at long length
- Bivariate Bayesian VARs - all series at the short length
- Multivariate Bayesian VARs - 20 "best indicators" at long length
- VARs with Factors - short and long serial length
- Forward looking information models

- VARs and BVARs
  - Estimate all combinations of models containing the target variable
  - Rank the models based on RMSE (classic) or posterior probabilities (Bayesian)
  - Compute mean of all models, a.k.a. combine the forecasts
    - Equal weigths or RMSE-based weights for classic VARs
    - Combine using posterior model probabilties (BVARs)

BRASSE
Modelling according to BRASSE

- Static Factor Models
  - Compute static factors - principal component analysis
  - Estimate VARs with target + 1 factor and average
  - Select factors in the VAR with BIC

- Forward looking information models
  - Use all series known prior to the target variable
  - Simple single-equation specifications
  - Average over all models, "best" model, factor model

BRASSE - Demonstration

- A minimal version of BRASSE - only Bivariate VARs

1. BRASSE in forecast mode
2. BRASSE in RMSE mode

Reverse Pac - a reverse application of indicators
Building blocks of the Riksbank's forecasts

- Indicator Forecast: $Y^I = g(Y, I)$
- Model Forecast: $Y^M = h(Y, X)$
- Judgements: J
- Final Forecast: $Y^P = f(Y^I, Y^M, J)$

Reverse Pac - a reverse application of indicators

How should indicator information update the final forecast?

- The function $f(.)$ is very complex
- How do new observations on Indicator relate to Final Forecast?

- Suggestion:
  - Use historical dependence between Y and I:
  - Expectation about I_{t+1} given Y_{t+1}^P
  - $I^Y = g^{-1}(Y, I)$

$$I_t = \alpha_0 + \alpha_1 I_{t-1} + \alpha_2 Y_{t-1} + \beta Y_t + a_t$$

- Prior distribution

$$\alpha_0, \alpha_1, \alpha_2 \sim \text{Uniform, non-informative}$$
$$\beta > 0, \beta < 0 \text{ or non-informative}$$

- Compare $\hat{I}_{t+1} | Y_{t+1}$ with I_{t+1} under consideration of $sign(\beta)$
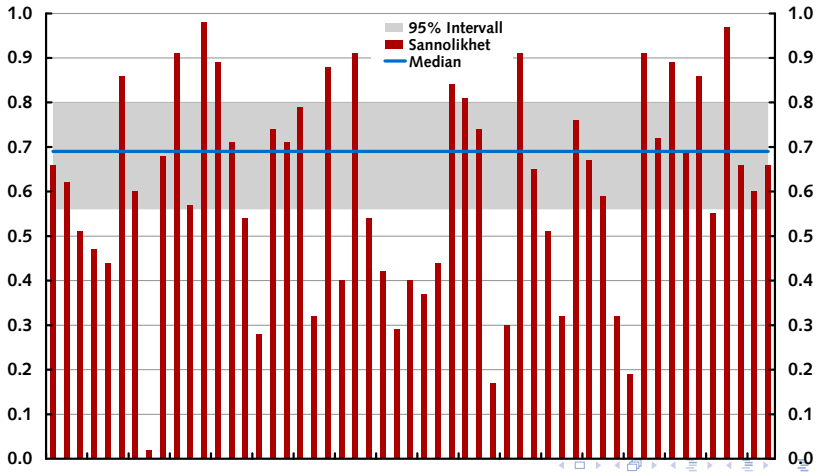
Reverse Pac - a reverse application of indicators
A true story

- GDP forecast
- Inflation Report 2005:3 & Inflation Report 2005:4:
    - Same National Accounts Release
    - New Business Tendency Survey

Reverse Pac - a reverse application of indicators

Graphical demonstration.

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Reverse Pac - a reverse application of indicators
Conclusions

IR 2005:3	IR 2005:4	Outcome
0.76	0.88	0.95

The forecast process at the Riksbank

The meetings and usage of the tools

1. Finacial and International Developments
   - Consensus Forecast and Bayesian VAR models, BRASSE & Reverse Pac + Judgments

2. Conjunctural assessment - next (one or two) quarters ahead.
   - BRASSE, BVAR, Reverse Pac, DSGE + Judgments

3. Views on the macroeconomic development
   - Conditional forecasts from BVAR and DSGE + Judgements
   - Conditions are short-term according to 2 + international forecasts for the full horizon

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5. Discussion on possible alternative scenarios

   - Simulations (mainly) by the DSGE model

6. Disaggregation of the macro forecast

   - (Conditioned) Bayesian VAR:s + Judgments

7. Presentation to the Board

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The forecast process at the Riksbank
The meetings continued

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Revisions of the Riksbanks short-term forecast
Impact and performance of different procedures one step ahead

	Actual Revision in line with	Proportion correct revision tendencies
Reverse Pac	64%	45%
BVAR	9%	55%
BRASSE	45%	45%
DSGE	27%	9%
Majority	45%	27%
AR(1)	18%	36%
Riksbank	(100%)	36%

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CPI Short-range Competition

RMSE one month ahead

Lead	Judgem.	CM-diff	CM-index
1	0.173	0.201	0.180
	BVAR	**ARIMA**	**Average**
1	0.198	0.226	0.172

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