

Does foreign sector help forecast domestic variables in DSGE models?

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The paper concludes sadly, that New Open Macroeconomic Model (NOEM) does not forecast better than a smaller closed-economy New-Keynesian (NK) model, or a simple closed-economy (backward-looking?) BVAR model for Australia, Canada and UK.

The paper identifies following possible reasons of such failure

- [1] NOEM might be misspecified
- [2] NOEM is too big
- [3] NOEM's priors are centred at wrong values

All these points are valid and interesting, particularly [1]. What might be the role of UIP equation in a model based on quarterly data?

Three additional possible reasons of this failure:

Reason 1: Fuzziness of data for international comparison

Reason 2: Statistical problems with forecasting and testing in rolling windows

Reason 3: Why I don't like DYNARE while solving forward-looking models

Reason 1: Fuzziness of data for international comparison

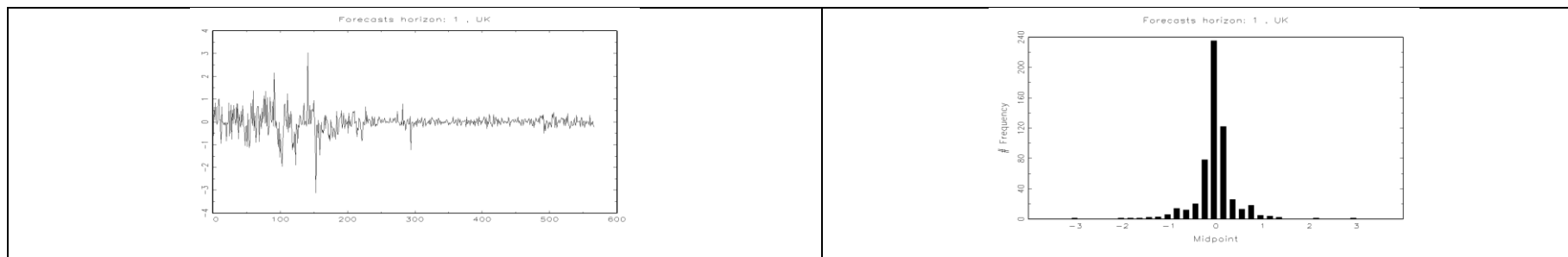
- National accounts are much less clearly defined these days, in times when multinational companies and plumbers alike are working in several countries.
- Hence, it is difficult to identify idiosyncratic shocks from common (correlated) shocks, particularly in Canada and UK.
- In a single-country model there is no problems with such identification.

Reason 2: Statistical problems with forecasting and testing in rolling windows

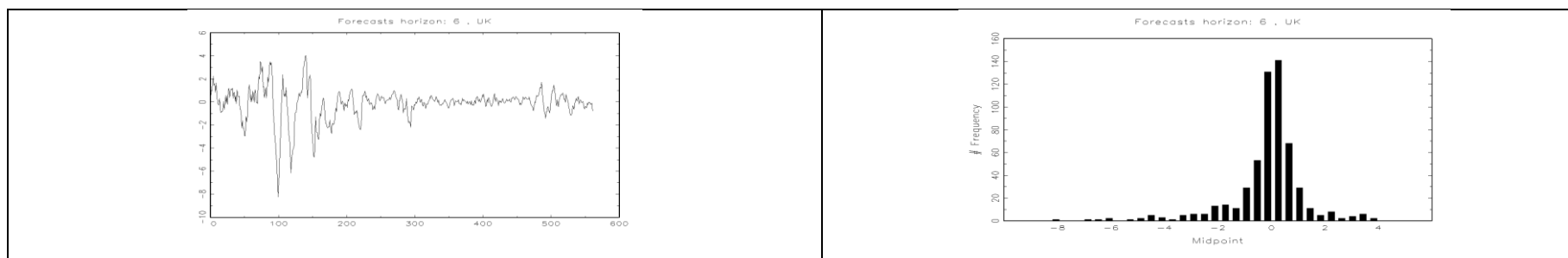
- It is known that distributions of forecast errors for different forecast horizons h are correlated.
- However, for recursive or rolling forecasts, forecast errors for the same h are correlated, if $h > 1$ and window (recursions) are updated at a frequency smaller than h .

Example: ARMA-GARCH FE's for UK, up do March 2017, recursive updating

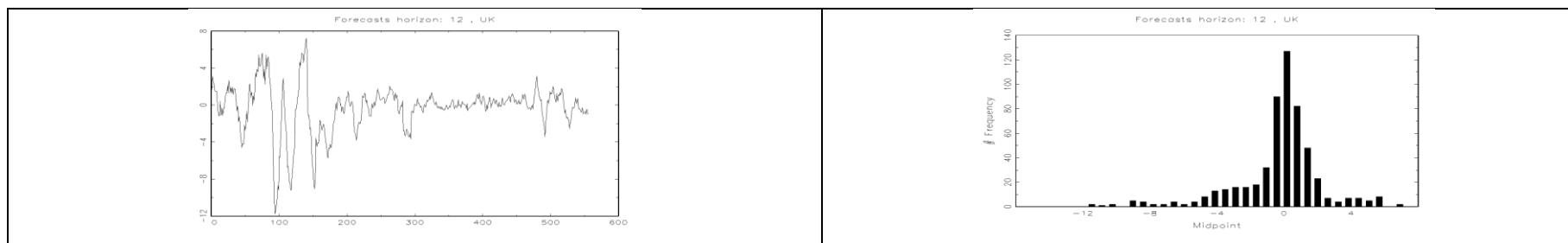
$h=1$



$h=6$



$h=12$



- Clearly, the correlation in series increase with the increase in h , and also the non-normality of the distribution of forecast errors is more evident.
- Consequently, the distributions of the Diebold-Mariano and Amisano-Giacomini statistics deviate from the theoretical ones, giving biased results.

What to do?

- [1] Update windows not by 1, but h (a lot of observations might be lost, particularly for long horizons).
- [2] Test the ‘orthogonalized’, in a way, forecast errors (e.g. forecasting after applying Yule-Walker transformation or the like).
- [3] For $h > 1$, use for testing improvements over the forecast obtained earlier (at time $h-i$, $i=1, \dots, h-1$ for the same time point rather than crude forecast errors).

Regarding the particulars of [2] and [3], it might be good to talk to Carlos Díaz about these ideas.

Reason 3: why I don't like DYNARE while solving forward-looking models

DYNARE solves forward looking models with expectations $f(y_t, y_{t+1}^e, y_{t-1}, x_t) = u_t$, by the modified Fair-Taylor *extended path*, EP:

EP solution after a shock: $f(\hat{y}_t, \hat{y}_{t+1}, \hat{y}_{t-1}, x_t) = 0$, (*Observational Equivalence*, OE)

In reality, $y_{t+1} \neq y_{t+1}^e$, as we usually err about y_{t+1} .

Hence, the solution should be something like: $f(\hat{y}_t, \hat{y}_{t+1}^e, \hat{y}_{t-1}, x_t) = 0$.

Is this relevant?

Ad-hoc Monte Carlo results for parameter' estimates in a forward-looking 2-country G-VAR model, 156 observations, 100 replications

	OE		No OE	
	BIAS	RMSE	BIAS	RMSE
Par 1	0.86	0.87	0.32	0.34
Par 2	0.47	0.47	0.08	0.11
Par 3	0.80	0.82	0.05	0.27

Results above suggest, that this is relevant: observational equivalence gives seriously biased parameters' estimates (and, hence, forecasts).