Real-time model uncertainty in the United States: the Fed from 1996-2003 (*Robert Tetlow and Brian Ironside*)

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discussion by Daniele Terlizzese

“ Judgement *by results*, the notion that someone’s merit should be measured in terms of his successes, is often passed off as ‘realism’,…but when we turn to …*appreciation or criticism of someone’s actions*…it is by no means true that the facts provide any definite answers;…to judge someone’s action in the only way that makes sense (requires) **taking into account, moment by moment, *the context, the situation and the state of information in which the action took place***” (de Finetti, 1970)

Key idea: the “state of information” does not just include (real-time) data.
Likely more important is the real-time **model**: the model that the CB had available when made its choices

It allows to look through the CB eyes, to see what it **expected to achieve** with its actions, rather than what it actually achieved, possibly by luck (or bad luck)
very good idea! + great service to SC

My main concern:
does the analysis of the Fed policy take full advantage of the availability of “real-time” models?
Another general concern:
is the time variability of models the relevant uncertainty for the design of robust policies?
Also, few specific comments (if time allows)

Overall, important paper, likely to set a new standard

Is the availability of real-time models fully exploited?

How would I do real-time analysis?

(1) recover what the Fed **expected** to achieve with its actions rather than what it actually achieved (in line with de Finetti's quote): use the models to **filter out surprises from history**

In detail:

- start with the first available model (time t);
- run stochastic simulation for t+1, conditional on baseline database;
- record average values of target variables;
- move to t+1 (change the model if new is available) and repeat (until T-1);
- compute the (ex-ante) loss associated

(2) see whether a smaller (ex-ante) loss could have been achieved, using nothing more than the information the Fed had available.

(basically, proceed as before, but let the rates be fixed by optimal control)

In detail:

- start with the first available model (time *t*);
- run stochastic simulation until *t* + *k* (say, 2-3 yrs), conditional on baseline database except rates + optimal control;
- record *t*+1average values of target variables;
- move to *t*+1 (change the model if new is available) and repeat (until T-*k*);
- compute the (ex-ante) loss associated

Comparison with the approach in the paper

(1) historical values not taken at face value; models used to filter out surprises

(2) go forward from the first available model, using new ones as they become available

Comparison with the approach in the paper

(1) historical values not taken at face value; models used to filter out surprises	(1) historical values taken at face value; models not used
(2) go forward from the first available model, using new ones as they become available	(2) go backward from a given model, keeping it unchanged

The Fed actions are judged with “the benefit of hindsight” (precisely what real-time analysis should not do!):

the loss does not include only what the Fed expected to obtain

to check whether something better could have been achieved a model is used that was not available for the period checked

Does the time variation of the Fed model capture the uncertainty relevant for the **design of robust policies**?

Does it really "narrow the range of would-be rival models to a plausible set"?

I am not convinced this is the case

Two (extreme) interpretations of model uncertainty:

(1) the true model is constant over time, but the CB, at the moment of action, is uncertain which model is true ("cross-section")

(2) the true model is changing over time, and when the CB makes its decision it knows which model is true, but it is uncertain which model will be true tomorrow ("time-series")

I claim that (1) is the most relevant for the design of robust policies.

Obvious when the action has only contemporaneous effects: in this case (2) is irrelevant

Also when lagged effects are present (2) remains of smaller importance.

Consider the model $x_t = \alpha x_{t-1} + \beta u_t + \varepsilon_t$

Suppose I want to minimise

$$E_t[(x_t^2 + \lambda u_t^2) + \delta(x_{t+1}^2 + \lambda u_{t+1}^2)]$$

under 3 alternative scenarios:

(0) (α, β) is known and constant

(1) (α, β) is unknown and constant

(2) (α, β) is known when the action is made,

but changes randomly in the two periods

Take α~U[0.1 – 0.9] and β~U[0.2 – 0.4], independent; Bayesian approach;

when not uncertain = expected value;

λ=1; δ=0.9

first period choice $u_t = -f_i x_{t-1}$.

The coefficient f in the, for this calibration, is:

0.1401 for case (0) (no uncertainty)

0.1802 for case (1) (cross-section)

0.1405 for case (2) (time-series)

Similar results are obtained with different calibrations: the “time-series” uncertainty is of small relevance

What does the time variability of Fed model shown in the paper represent? Not clear

Model changes because world changes, new issues arise, new questions get asked $\Rightarrow$ case (2)?

Model changes because forecast mistakes are found $\Rightarrow$ case (1)?

Maybe a little of both: “changes to the model were not always a reflection of the model underperforming at the tasks it was originally built to do; in many instances, it was an outcome of an expansion of the tasks to which the model was assigned”

Anyway, range of would-be rival models is larger than what actually explored Es: how much inertial is the model seems key

Implications for the drafting?

Focus on “comparative advantage”;

preferably, avoid “model uncertainty”

A new flashy title?

Real-time analysis of the monetary policy in the United States: It’s the model, stupid!

Few additional comments

Real-time optimal coefficients: due to the choice of the loss (conditional) they change because both models and initial conditions change. Disentangle the two.

Loss: should change with changes of model

Ex-post optimal rule: is it the foresight or the effect on expectations?