Hi, I'm a Macro professor

and I'm here to help!

Jon Faust

`http://e105.org/e607`

- **Very happy to be back at KC Fed**

  My time as RA here (1981-1983) formative in many ways

e.g., Bryants, no finer sauce

also in Macro

- July 1982: strip mall bank the 10th district made some stupid loans and shook the financial system

  Penn Square caused collapse of Continental Illinois

- August 1982: learned many bigger banks had lent multiples of capital to LDCs who wouldn't be able to repay

Macro modelling also in crisis

- ## Sims, 1980
  '…claims for identification in these models cannot be taken seriously.'

- ## Lucas, 1981
  'As an advice giving profession we are in way over our heads'

Things were so different . . .

- Fortunately, all that's behind us

Doh!

They're doing show trials for DSGE models. . .

Testimony

- ## Solow:

  Especially when it comes to matters as important as macroeconomics, a mainstream economist like me insists that every proposition must pass the smell test: does this really make sense? I do not think that the currently popular DSGE models pass the smell test.

Testimony

- ## Chari,

  A useful aphorism in macroeconomics is: 'If you have an interesting and coherent story to tell, you can tell it in a DSGE model. If you cannot, your story is incoherent.'

Almost as good as coming home to K.C.

- Two lions of their camps eloquently re-stating positions they've held for my whole career

- Both miss the point

Chari: either vacuous or wrong

- ■ Suppose we add a constraint that the model be solvable

  If you have an interesting and coherent story to tell, you can tell it in a DSGE model that we can currently specify, solve, and manipulate. . .

A Solowesque reply to Solow

- ### Solow gave Inaugural Hicks lecture, 1984
  beautiful paper in Oxford Ec. Papers (Nov. p.13-25)

- ### Defended young Hicks against older Hicks's savage treatment of the IS/LM model

A Solowesque reply to Solow

- **Older Hicks was right:**
  IS/LM model doesn't pass the smell test

- **Younger Solow was right: IS/LM was a formalization of some key things and helped advance understanding**

- **There should is no question that the same is true of DSGE models**

Uninteresting question

- Is the DSGE glass nearly empty or virtually full?

More interesting to me

- There is at least enough liquid to drink sparingly.. . . .

- . . . but what *is* that liquid anyway?

  let's pay close attention to what it is we are drinking.

More interesting to me

- How best can we use macro models (such as they are) to improve the reliability of the monetary policymaking process?

Main point

- It takes highly disciplined analysis to avoid pitfalls.

- I'll give 7 suggestions

Stylized view of policy analysis

- Enter meeting at t with last period's optimal path

$$i^*_{t|t-1}, i^*_{t+1|t-1}, \cdots$$

- Revise this path in light of news arriving b/t $t-1$ and t.

Policy analysis:

- Update perceived optimal policy path in light of structural interpretation of news.

Simple model of news

- In a linear Gaussian (DSGE-model) world news is one-step forecast errors in observables, Z_t:

$$\nu_t = Z_t - Z_{t|t-1}$$

Simple model of structural interp.

- Revision to policy path a function of the structural interp. of the news.

- In the VAR case,

$$\nu_t = C\varepsilon_t$$

where $\mathrm{vcov}(\varepsilon) = I$.

- Or given any inferred $\hat{\nu}_t$:

$$\hat{\varepsilon}_t = C^{-1}\hat{\nu}_t$$

Note

- **VARMA case a bit different**
  but not enough to matter for this talk

Model-based policy analysis

- ### Does the model get the news right?
  Purely a question of reduced form forecasting

- ### Does the model get the structural interp. right?
  Purely a question of C, the impact matrix for structural shocks

Suggestions

- I'll first focus on the news (pure forecasting)
- Then structural interp. (purely about C)

3 papers

- **with Jonathan Wright (FW).**
  Comparing Greenbook and Reduced Form Forecasts using a Large Realtime Dataset, REStat 2009.

- **Rochelle Edge and Refet Gurkaynak**
  How useful are DSGE model forecasts for Central Bankers? forthcoming BPEA

- **with Abhishek Gupta,**
  Posterior predictive analysis for DSGE modeling, (up shortly on my website)

1. Forecast evaluation: You should do it

- Easy to get excited about wonders of a new model

- But all too often we find shiny new models are worse than useless in forecasting

  Meese-Rogoff re: exchange rate models the

  classic example

2. Real-time/vintage data issues matter

- Serious evaluation for practical realtime forecasting requires real-time data.

- We now know that both model rankings and absolute quality measures may be different in realtime data.

  realtime data often is not a huge issue, but matters in enough cases to be worth the bother

Old hat

- I'm sure these first two are old hat to this group

3. Nowcast (& backcast) are different

- All 'forecasts' start with nowcast and backcast

- For now and backcast, have the option of 'bean counting'

  replicate the data agency; data construction, not economic modelling

3. Nowcast (& backcast) are different

- ## Fed does this
  Fed's nowcast is really good

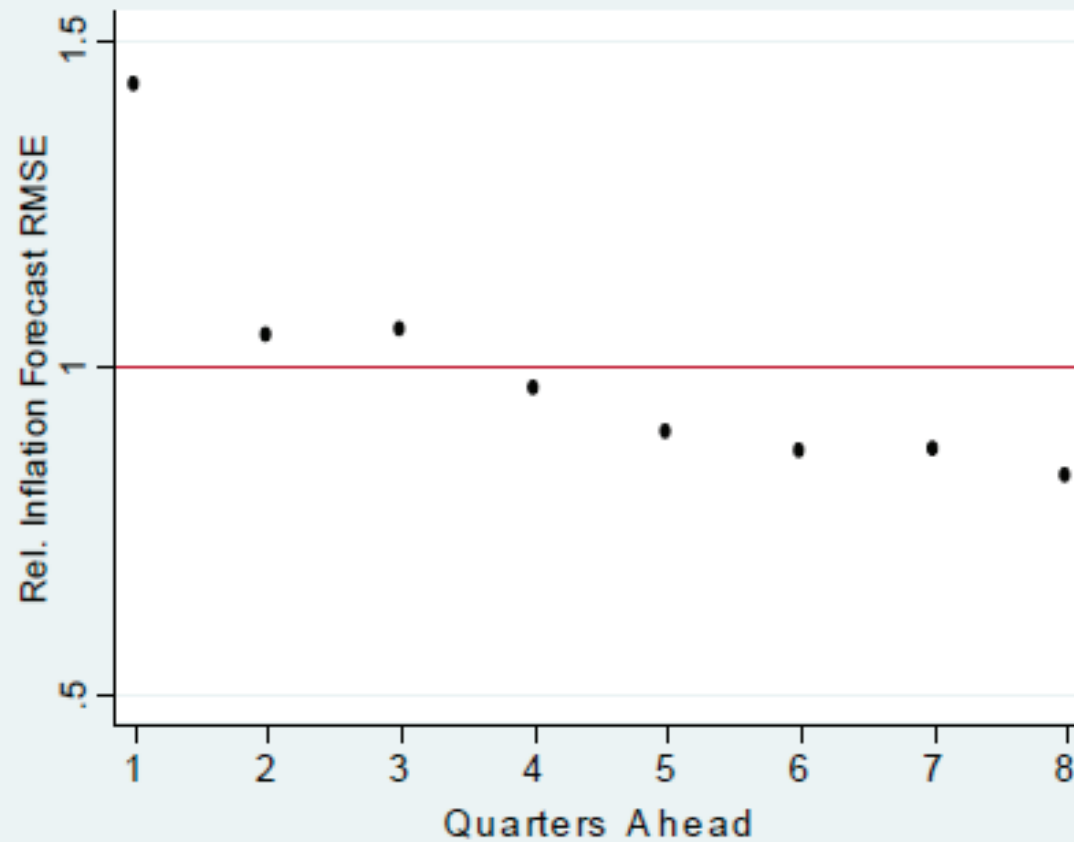# Greenbook v. univariate AR(4), GDP Growth

- **RMSE**

hor:	0	1
GB	2.17	2.75
AR	2.77	2.76

From FW.

DSGE vs. GB

DSGE Model Relative to GB

Note 1

- The picture is from Edge-Gurkaynak
- They label the nowcast as horizon 1.

Note 2: Warning label

- In this talk, I am using selective, provocative reporting

  not being thorough

- Attempting to motivate you to consider these points

Backcast and nowcast

- Every good forecast should start with a sophisticated nowcast

  which may involve different machinery than the forecast

- Corollary: practical forecast comparison should give all models a good nowcast

  which may involve different machinery than the forecast

- FW does this, and it matters

4. H^3: Heavy-handedness helps

- ## Very strong ad hoc restrictions often help
  (overfitting hard to avoid)

- ## Almost impossible to forecast well without draconian restrictions
  This is very consistent across many studies

4. H^3: Heavy-handedness helps

- **In FW: often hard to benefit from more than 1 data series**

  GDP: univariate AR does about best

- **Among multi-variate methods: simple average of simple models always among the best**

A Faustian Question

- You are macro forecasting, 1997–2004.

- Would you trade all ability to change your forecast for one bit of future knowledge: the ex post mean?

Edge-Gurkaynak

Figure 3. RMSEs of Alternative Forecasts

x: DSGE, o: mean diamond: GB, box: BVAR
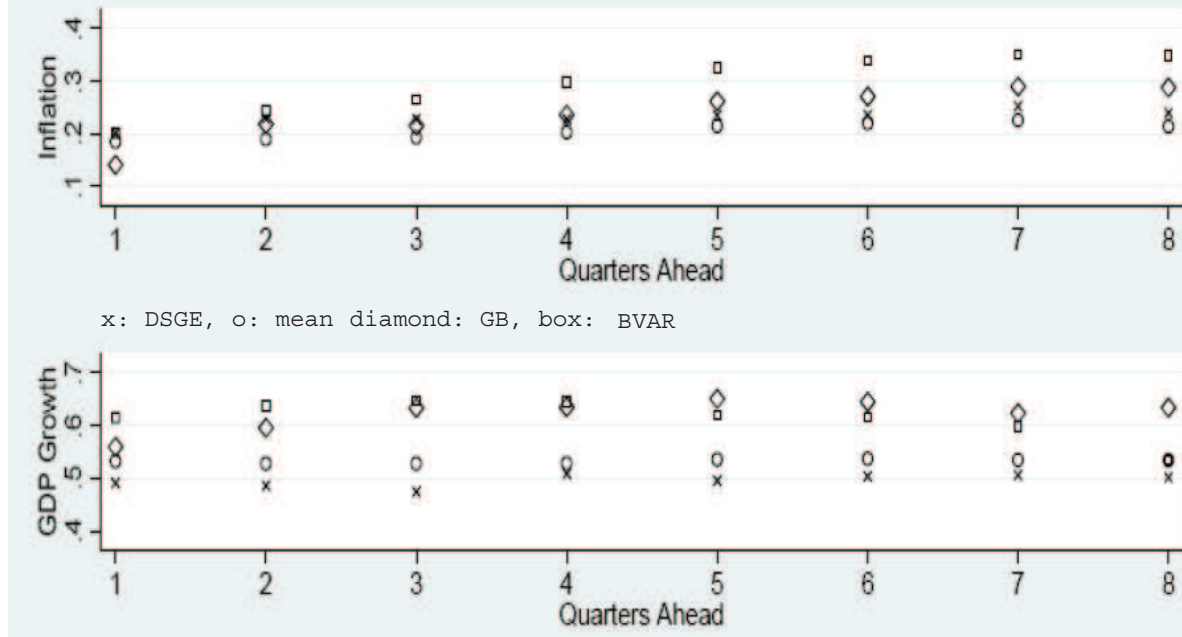
ex post mean; x: DSGE; ◊: GB; □: BVAR

In other work

- I have found similar results for inflation report forecasts

- Of course, the mean isn't known ex ante
  but we can approximate this in realtime

Dr. Wright's democratic prior

- ## Shrink very heavily toward a real-time guess at the *long-run* mean
  e.g., a survey long-term expectation

- ## Works very well
  Jonathan Wright, Evaluating Real-Time VAR Forecasts with an Informative democratic Prior

H^3

- ## H^3 is well-established
  Without H^3 you are toast

5. No evidence formal econ. helps

- **Deliberately contentious**
  perhaps overstated

- **I mean: fairly strict adherence to behavioral restrictions from formal model has never been shown to help**
  (no implied indictment of judgemental use of economic wisdom)

5. No evidence formal econ. helps

- Some formal economic models do ok in quasi-realtime work

  Edge-Gurkaynak verify this

- When formal economic models have done well, no evidence that the economics is anything but H^3 in disguise

5. No evidence formal econ. helps

- No example exists of an economic model selected *ex ante* doing well for headline numbers

6. Quasi means not

- Generally true

- but especially in 'quasi-realtime'

- We have one dataset
  one collection of vintages

- If we search, we can find a model that does well by any criterion

6. Quasi means not

- Remember: we give rewards to optimizing agents who 'find a model that fits'
  e.g. Smets-Wouters

- Few rewards for those who count the failed attempts...

- What would an economist predict?

Example

- Since Meese-Rogoff, economists have been trying to show some formal model has value forecasting exchange rates.

- Nelson Mark (1995) showed a 'monetary model' forecasted medium horizons well
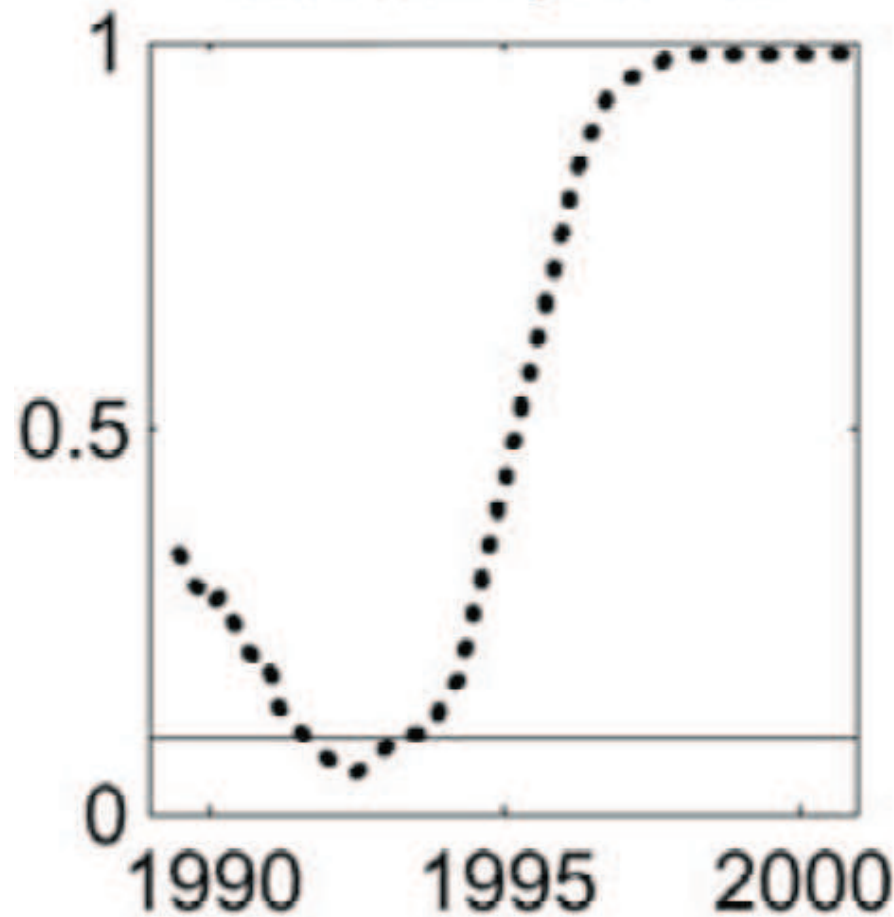
Faust-Rogers-Wright 2003, JIE

- **Re-do Mark using 30 vintages surrounding the one Mark used**

  As if Nelson did his exact work every quarter or so using the latest vintage

Key result

- Plot Mark's p-value for rejecting 'no predictability' of \$/DM exchange rate

p-value against vintage date

Mark missed the minimum p-value only slightly

Quasi means not

- Quasi realtime (in an optimizing profession) means not realtime
- Very difficult to adjust for

Quasi means not

- So what do we do?

- Use economics!

7. Stress test the structural interp.

- We need structure for policy analysis

- Pushing on the plausibility of the structural implications can also help distinguish economic wisdom from H^3.

One form of stress test

- **Plug for Faust-Gupta**
  Abhishek Gupta, just started at Gettysburg
  College

- **Papers up shortly**

Simple idea

- Key structural relation for policy analytics,

$$\hat{\varepsilon}_t = C^{-1}\hat{\nu}_t$$

$\hat{\nu}_t$: estimated news
$\hat{\varepsilon}_t$: implied structural shocks

Simple idea

- ### As Bayesians, we can ask:
  How likely would the model have been to produce shocks like the $\hat{\varepsilon}$s implied on the sample

- ### formally: posterior predictive analysis

- ### Akin to frequentist residual diagnostics

Details

- **A bit complex to compute for 'structural' elements like structural shocks**

  Adapt ideas of Gelman et. al on posterior predictive anal.

- **Contentious to 'orthodox' Bayesians**

  But we argue far less problematic in this context

Illustration: Smets-Wouters, US model

- Under the posterior, the estimated correlation of the structural shocks on the sample was quite high

  almost all mass far from zero

- Probability the model would generate a sample where the estimated structural shocks would be as correlated as those estiamted on the SW sample: 0.00

More troubling

- Partition obs. into those in spans of at least 2 neg. quarters of growth and others

- Variance and correlation of shocks is different during the periods of 'recessions'

- Shocks are bigger and have diff. correlation structure

More troubling

- Probability the model would generate a sample like this is essentially zero.

Interpretation

- We often say we want a structural model b/c it tells a story

- The story of the SW model is that post-War business cycles were a collective freak draw, never to be repeated

  A highly unlikely confluence of abnormally large and abnormally correlated shocks

Aside

- We show how to use this info. to refine the structure. . .

Overall

- Macro and policy modeling were in a precarious position as when I was an RA at FRBKC

- And things are not so different now

But I'm optimistic

- I don't think we need to start over as we did in 1980

- We have much better tools, data, and models

  And the benefit of hindsight on mistakes of the 1970s

The glass...

- The glass is far from empty...
- ...we should take care as we drink

Main point

- **Takes very disciplined analysis to avoid silliness**

  (and perhaps policy tragedy)

- **I've tried to highlight some elements of discipline I find useful**

Central Banks

- Fed (and other CBs) have been taking the lead in disciplined anlaysis

- And this conference is another outstanding example of pushing disciplined, policy-relevant work

Central Banks

- I can't wait to see what the remainder of the conference has in store