

# A Comparison of Forecast Performance Between Federal Reserve Staff Forecasts, Simple Reduced-Form Models, and a DSGE Model

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# Contribution

- Compare performance of the Fed's Greenbook forecasts to that of forecasts from structural (DSGE) and atheoretical econometric models
- Consider quarterly forecasts of U.S. GDP growth and inflation. Real-time data.
- Motivation:
  1. How accurate were the Greenbook forecasts?
  2. Hope that DSGE models forecast as well as atheoretical models or professional forecasts  $\Rightarrow$  support their use for forecasting by central banks, who like these models' ability to "tell a story"

# Models

- Structural: build upon Smets and Wouters (2003) - type of DSGE model. Key innovations:
  - Production side: allow for different growth rates of output for investment goods ( $\Rightarrow$  matching stylized fact that production of investment goods grew more rapidly than other goods during the sample period)
  - Demand side: disaggregate demand into durables, non-durables and residential investment ( $\Rightarrow$  try to capture different cyclical properties of different categories)
- Reduced form:
  - Random walk (maybe not the most natural choice for output growth?)
  - 4-variable VAR and Bayesian VAR (Minnesota prior)

# MAE of different methods (Figures 1 and 2)

Figure 1: MAEs of Different Models and Greenbook (August 1996 - May 2000)

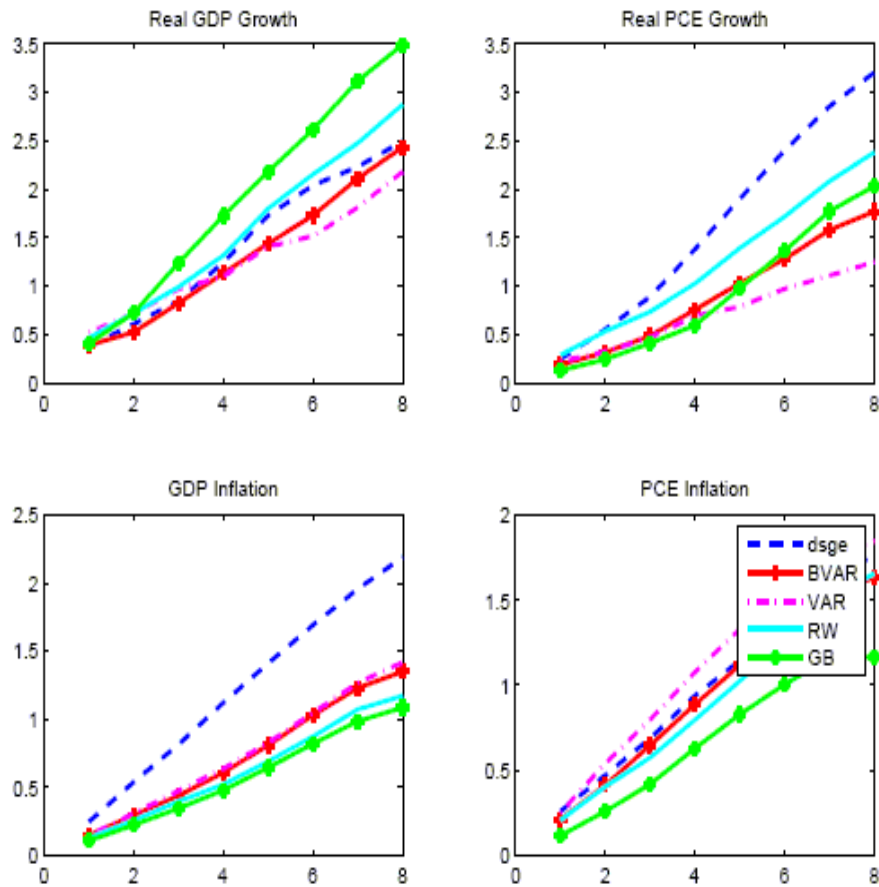
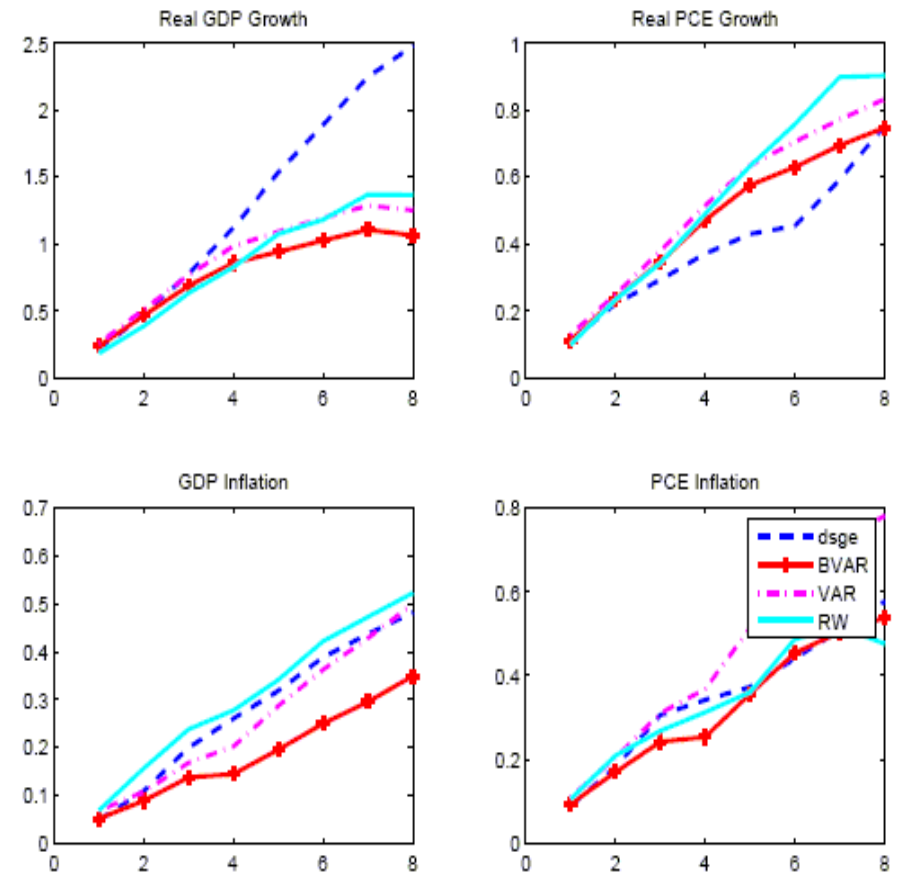


Figure 2: MAEs of Different Models and Greenbook (June 2000 - Jun 2003)



# Some general comments on results

- No forecasting method is best across variables, forecast horizons and time periods
  - BVAR arguably most robust, particularly at long horizons
- All methods have similar performance at short horizons but larger differences in accuracy at long horizons
- Big reduction in forecast MAE for all methods from 1996-2000 to 2000-2003  
⇒ possible evidence of structural instability (but, could also be caused by a reduction in the variance of the shocks) ⇒ investigate more formally?

# Motivation 1: Accuracy of Greenbook forecasts?

- Greenbook forecasts least accurate for GDP growth
- Most accurate for both GDP inflation and PCE inflation
  - Similar to Ang, Bekaert, Wei (2006), who show that survey forecasts beat econometric models for all measures of inflation except PCE, for which nothing beats a random walk  $\implies$  maybe Greenbook forecasts better than other surveys for inflation?

## Motivation 2: Accuracy of DSGE forecasts?

- DSGE forecasts almost always less accurate than BVAR
- Bad performance at long horizons
- Instability of performance over time (reversed ranking over the two subsamples)
- Should central banks use the new generation of DSGE models for forecasting?  
(Also, what is "the story" that central banks want the DSGE to tell?)

⇒ important to investigate the reasons for the improved fit of "new-generation" DSGE models

# Understanding the fit of this paper's DSGE model

- DSGE may fit well because of *disaggregation* (different growth rates for different components of GDP)  $\implies$  better to aggregate forecasts of GDP components from time-series models?
- A DSGE is a restricted VAR, with restrictions given by economic theory  $\implies$  are these restrictions important? (Schorfheide, Del Negro, Smets and Wouters, 2004: best model is "intermediate" between a DSGE and a VAR)
- Possible unfair comparison between 11-equation (linearized) DSGE and a 4-equation VAR  $\implies$  compare to a VAR with same 11 variables to understand the value of economic restrictions for forecasting