Discussion of “The Limitations of Forward Guidance” by Gavin et al.

Marco Del Negro
Federal Reserve Bank of New York

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Disclaimer: The views expressed are mine and do NOT necessarily reflect those of the Federal Reserve Bank of New York or the Federal Reserve System
Outline

1 Forward Guidance 101: The effects in a linear DSGE
   • This paper assesses the effects of forward guidance using a fully non-linear stochastic model .. but let’s build some intuition using a linear model

2 Forward guidance in an estimated DSGE model
   • Impulse response functions
   • A policy experiment: The effects of the Sept 2012 statement
   • The “forward guidance puzzle”

3 Are non-linearities the solution to the puzzle?
Forward Guidance 101: The effects in a linear DSGE

• Take a 3-equations NK model

• Modify the policy rule so to introduce forward guidance via anticipated policy shocks (Laseen & Svensson 2009):

$$\hat{R}_t = \psi_\pi \hat{\pi}_t + \epsilon^R_t + \sum_{k=1}^{K} \epsilon^R_{k,t-k}$$

where $\epsilon^R_{k,t-k} =$ is “news” about future policy – that is, a shock that is known to agents at time $t - k$, but affects the policy rule $k$ periods later, that is, at time $t$.

• Are these policy news shocks more or less powerful than contemporaneous (usual) policy shocks?
Forward Guidance 101: The effects in a linear DSGE

**Step 1:** Consumption depends on the (real) long rate:

From the Euler eq. \( \hat{c}_t = -E_t[\hat{R}_t - \hat{\pi}_{t+1} + \hat{c}_{t+1}] \rightarrow \)

\[ \hat{c}_t = - \sum_{j=0}^{\infty} E_t[\hat{R}_{t+j} - \hat{\pi}_{t+1+j}] \]

\[ \hat{LR}_t \]

**Step 2:** Anticipated shocks move consumption tomorrow and today \( \rightarrow \)

stronger effect on inflation:

- (Assume for now the price level is fixed \( \rightarrow \) the Fed pegs the real rate)
- **Contemporaneous** shock: \( \hat{R}_t = -\Delta, \hat{R}_{t+1} = 0, \hat{R}_{t+2} = 0... \rightarrow \hat{LR}_t = -\Delta, \hat{LR}_{t+1} = 0,... \rightarrow \hat{c}_t = \Delta, \hat{c}_{t+1} = 0,... \)
- **Anticipated** shock: \( \hat{R}_t = 0, \hat{R}_{t+1} = -\Delta, \hat{R}_{t+2} = 0... \rightarrow \hat{LR}_t = -\Delta, \hat{LR}_{t+1} = -\Delta,... \rightarrow \hat{c}_t = \Delta, \hat{c}_{t+1} = \Delta, \hat{c}_{t+2} = 0,... \)
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**Step 2:** Anticipated shocks move consumption tomorrow and today $\rightarrow$ stronger effect on inflation:

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Step 3: Now let $\pi$ move. In the NK model inflation is the PDV of future expected output gaps

$$\hat{\pi}_t = \kappa \sum_{j=0}^{\infty} \beta^j E_t[\hat{c}_{t+j}]$$

- **Anticipated** shock: more prolonged output increase $\hat{c}_t = \hat{c}_{t+1} = \Delta$ $\rightarrow$ $\hat{\pi}_t$ rises more $\rightarrow$ *real* rate drops today.

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Impulse Responses to Anticipated Shocks in an Estimated (FRBNY) DSGE Model

Quarters Ahead:

0  4  8

Interest Rate

0  4  8 12

10-year Rate

0  4  8 12

Output Level

0  4  8 12

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Core PCE Inflation

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A Policy Experiment: The Effects of the Sept 2012 Statement

- Imagine the following “counterfactual” experiment. We are at the end of August 2012, and ask ourselves: What if at the September meeting the Fed was to announce that FFR remains at the ZLB through 2015
Baseline forecasts (dashed line)

- Incorporate pre-FOMC meeting FFR expectations (whether due to Delphic or Odyssean fwd guidance) into the DSGE model – **FFR lifts off in late 2014**.

- Add Expected FFR ($\text{FFR}^e_{t,t+k}$, backed out from OIS rates) to the measurement equations:

\[
\text{FFR}^e_{t,t+k} = 400 \left( E_t \hat{R}_{t+k} + \ln R_* \right) = 400 \left( \psi_{R,2}(\hat{\theta}) \Phi_1(\hat{\theta})^k s_t + \psi_{R,1}(\hat{\theta}) \right), \quad k = 1, \ldots, K
\]

where

\[
s_t = \Phi_1(\hat{\theta}) s_{t-1} + \Phi_\epsilon(\hat{\theta}) \epsilon_t
\]

is the transition equation, and

\[
y_t = \psi_1(\hat{\theta}) + \psi_2(\hat{\theta}) s_t
\]

is the measurement equation.
• **Counterfactual forecasts (solid line)**
  
  • Choose anticipated policy shocks so that post-FOMC

  \[ FFR^{e}_{t,t+k} = ZLB \ (25 \ \text{bp}) \]

  through 2005Q2.

  • Del Negro and Schorfheide (2013, Handbook of Economic Forecasting chapter)

  • That is, assume that the change in FFR expectations following the Sept 2012 FOMC is entirely due to **signaling** (Odyssean fwd guidance)
What is the Outcome of this Experiment?

- The **Forward Guidance Puzzle**
- Excessive response of activity/inflation, also discussed in Carlstrom, Fuerst, and Paustian (2012)
What is the “Excessive” Response Due To?

1. The **NKPC** (Kiley et al. NBER Macroannual 2014, Carlstrom et al.)

2. The **Euler equation**: long-term rate $\rightarrow$ activity

3. **Excess propagation**: too strong a response of long-term rate to news shocks

- Drop in long term rates. *model* vs data: 10-year yield: 25 vs 3 bps; 5-year yield: 16 vs 8 bps.
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Are Non-Linearities the Solution to the Puzzle?

• We would not know from the current draft of the paper
  • My suggestion: Do a policy experiment like the one above and compare outcomes in **linear vs non-linear** solution
  • If linear $\rightarrow$ puzzle, non-linear $\rightarrow$ no puzzle, done!

• Model: Non-linear version of the 3-equations NK DSGE model

• I am skeptical that the linear version of this model would produce any forward guidance puzzle: no endogenous state variables, no propagation (Calstrom et al.).
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Results in the paper

1) “Conventional monetary policy is more stimulative than forward guidance away from the ZLB.”

These non-linear IRFs look familiar to me ... Is the transmission mechanism very different in the linear model?
2) “If the economy is in a deep recession or households expect a slow recovery, then the stimulative effect of forward guidance is minimal because the short-term nominal interest rate is likely to remain at its ZLB even without forward guidance.”

- “Our finding of a limited stimulative effect of forward guidance at the ZLB offers an explanation for the Forward Guidance Puzzle described in Del Negro et al. (2012)”

- Again, wouldn’t we get the same result in a linear model, as long as we impose the ZLB?

![Diagram showing the relationship between Monetary Policy Shock and Consumption, and Monetary Policy Shock and Expected Interest Rate.](Image)
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Conclusions

- Ambitious paper, but the results do not seem too surprising
  - Although I suspect there is much more in this analysis than currently transpires from the paper.
- In spite of my skepticism, non-linear model are the way to go: term premia!