Discussion of:

The Forward Guidance Puzzle

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THREE PARTS

- Empirical investigation of three forward guidance announcements
  - Seek to control for “Delphic” component of shock

- Forward guidance in standard medium-scale DSGE model
  - Effects on contemporaneous outcomes implausibly large
  - “Forward guidance puzzle”

- Propose a resolution to the puzzle:
  - Blandard-Yaari perpetual youth model
  - Makes model less forward looking
PART I
The Tale of Three Forward Guidance Announcements
Information Content of Announcements

Monetary announcements may convey information about:

- Future monetary policy
  - News about future path of interest rates conditional on unchanged beliefs about other fundamentals
  - “Conventional” view or “Odyssean” forward guidance

- Future path of fundamentals
  - Evidence: Campell et al. 12, Nakamura-Steinsson 15
  - “Delphic” forward guidance

Furthermore, different monetary announcements may contain a different mix
Figure 2: The Effect of Forward Guidance Announcements on Expectations

August 2011 | January 2012 | September 2012

GDP Growth

CPI Inflation

3-Month TBill

10 Treasury

Notes: The panels in Figure 2 show the estimates of $\beta(k, h)$ for three different events, August 2011, January 2012, and September 2012, and four different variables, GDP growth, CPI inflation, the 3-month TBill, and the 10-year Treasury rate. Variables and events correspond to rows and columns in the panel, respectively, while the horizon $h$ is in the horizontal axis of each plot. For each triplet $(e, k, h)$ we report the OLS estimate of $\beta(k, h)$ (solid black) and the 68 and 90 percent bands (dash-and-dotted and dotted lines, respectively) computed using heteroskedasticity-robust standard errors. The sample for each regression is $t= 2008.06, .., 2015.02$. 

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To estimate effects of “pure” forward guidance ...
(i.e., “Odyssean” part only)
... must control for news about other fundamentals
(i.e., “Delphic” part) and QE
ISOLATE EFFECT OF NEWS ABOUT INTEREST RATES

Same as before expect different characterization of policy:

$$\Delta f_{it} = \beta_1 POLICY_t + \beta_2 X_{it} + \epsilon_{it}$$

Policy includes:

- Dummy for forward guidance announcement
- Dummy for QE announcement
- Dummy for QE continuation announcement
- Measure of output language
- Measure of inflation language
Figure 3: Decomposing FOMC Statements: The Effect of Forward Guidance, QE Announcements and Bad GDP Language

Notes: The panels in Figure 3 show the estimates of $\beta(k,h)_e$ for three different elements of the FOMC statement – forward guidance announcements, QE announcements and bad GDP language – and four different variables, GDP growth, CPI inflation, the 3-month TBill, and the 10-year Treasury rate. Variables and events correspond to rows and columns in the panel, respectively, while the horizon $h$ is in the horizontal axis of each plot. For each triplet $(e,k,h)$ we report the OLS estimate of $\beta(k,h)_e$ (solid black) and the 68 and 90 percent bands (dash-and-dotted and dotted lines, respectively) computed using heteroskedasticity-robust standard errors. The sample for each regression is $t=2008.06,..,2015.02$. 

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Very innovative and interesting!

Next steps:

- Unexpected versus expected language
- Unexpected versus expected QE
- More sophisticated measure of forward guidance
PART II
Forward Guidance in a Standard Medium-Scale DSGE Model
This section – originally circulated in 2012 – among first papers to draw attention to immense power of forward guidance (see also Carlstrom, Furst, and Paustian, 2012; Kiley, 2012)

Conduct policy experiments in FRBNY DSGE model
- Similar to Christiano-Eichenbaum-Evans 05, Smets-Wouters 07
- Includes credit frictions as in Christiano-Motto-Rostagno 09

Policy experiment:
- Starting from baseline forecast about nominal rates (inferred from forwards)
- Hold nominal rate at 25bp until mid-2015
Figure 4: The model-implied consequences of forward guidance

Notes: The figure shows the model's predictions conditional on alternative assumptions regarding the federal funds rate. The black solid lines show the historical data. The dashed red lines show the FRBNY DSGE model's baseline forecast. The solid red lines show in turn the model's predictions in a counterfactual policy experiment in which the federal funds rate is set to 0.25 percent until 2015Q2.

Importantly, note that the parameters $\sigma_{k,r}$ do not enter any of the policy experiments described below.
Figure 4: The model-implied consequences of forward guidance

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the farther in the future will the drop in interest rate take place. The rise in inflation induces in turn a further reduction in current and expected future real interest rates, which amplifies even more the stimulus provided by the forward guidance announcement. Carlstrom et al. (2012b), Kiley (2014), and Chung et al. (2014) argue that the economy's excessive response to forward guidance is due to this amplification mechanism implied by the New Keynesian Phillips curve. In addition, the output response in the medium-scale model also depends on the behavior of real investment, which also relates to the long-term real interest rate.

Figure 5: Interest-rate projections farther into the future

Notes: The figure shows the model's predictions for the federal funds rate farther into the future. The black solid line shows the historical data. The dashed red line shows the FRBNY DSGE model's baseline forecast. The solid red line shows the model's predictions in a counterfactual policy experiment in which the federal funds rate is set to 0.25 percent until 2015Q2. Finally, all these effects are made stronger by the fact that in this model the long-term interest rate responds very strongly to the policy announcements. Figure 5 shows the paths of short-term interest rates under the baseline projection (red dashed lines), and the counterfactual policy (red solid line) until 2027Q4. This figure reveals that while the expected short-term rate is only 15 basis points lower in the counterfactual than in the baseline at the end of 2014, the difference between the two interest-rate paths is expected to be much larger farther in the future, in particular between 5 and 10 years.

To see how all effects combine in the medium scale model, Figure 6 shows the impulse response functions to contemporaneous and anticipated policy shocks. Specifically, the figure
Effects of Forward Guidance

- Very, very persistent fall in nominal rates
- 10-year yield falls more than 5-year yield!!
- How can this be?
Effects of Forward Guidance

- Forward guidance shock reveals:
  - Huge response to far future changes in interest rates
  - Model has very persistent oscillatory dynamics
- Oscillatory dynamics imply that small stimulus over 10 quarters creates large recession five years later
  (not just FRBNY model also SW 07 model)
- Valuable insight about models we use!!
- Not a desirable feature?!?
PART III
The Puzzle Resolved
Why Does It Work?

- Shrinks coefficients on forward-looking terms in all equations
- Makes model less forward looking
- For example in the price Phillips curve (ignoring indexation):

\[ \pi_t = \tilde{\beta}E_t\pi_{t+1} + \kappa mc_t \]

where \( \tilde{\beta} = \eta \beta \) and \( \eta < 1 \). So, \( \tilde{\beta} < \beta \).
length of non-hand-to-mouth status which is 11 years. Adding this to the probability of dying implies a value for $p$ of around 0.03.

We set our benchmark value of $p$ to 0.03 and raise it to 0.06 to include other forms of wealth "re-setting" that we might have omitted. Such values are still well below the posterior mean of $p = 0.1292$ obtained by Castelnuovo and Nisticò (2010) based on a Bayesian estimation using only aggregate data.

4.3.2 Results

Table 2 shows how different assumptions about the death probability $p$ affect some of the key parameters. The implied value for the discounting coefficient entering equations (45), (46), (56), and (57) varies significantly with changes in $p$. Our lower bound $p = 0$ implies no discounting in the consumption Euler equation as $\eta = 1$. This coefficient is lowered to 0.96 when $p = 0.06$. Similarly, with such a value of $p$, the fluctuations in expected future variables are also discounted more heavily in the equations determining investment, price inflation, and real wages. The slope of the Phillips curve $\kappa$ is also affected, rising with the death probability $p$.

<table>
<thead>
<tr>
<th>Death probability</th>
<th>$p$</th>
<th>0</th>
<th>0.03</th>
<th>0.06</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Implied coefficients</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discounting in consumption</td>
<td>$\eta$</td>
<td>1</td>
<td>0.987</td>
<td>0.960</td>
</tr>
<tr>
<td>Discounting in investment</td>
<td>$\beta/(1 + \beta)$</td>
<td>0.500</td>
<td>0.496</td>
<td>0.490</td>
</tr>
<tr>
<td>Discounting in price inflation</td>
<td>$\beta/(1 + \nu_p\beta)$</td>
<td>0.817</td>
<td>0.809</td>
<td>0.791</td>
</tr>
<tr>
<td>Discounting in real wage</td>
<td>$\beta/(1 + \beta)$</td>
<td>0.500</td>
<td>0.496</td>
<td>0.490</td>
</tr>
<tr>
<td>Slope of Phillips Curve</td>
<td>$\kappa$</td>
<td>0.022</td>
<td>0.022</td>
<td>0.024</td>
</tr>
</tbody>
</table>

As shown in Figure 8, increasing the death probability has little effect on the economy’s response to contemporaneous monetary shocks. This suggests that the model has standard implications in response to contemporaneous shocks. However, in response to anticipated shocks, the effects of a positive $p$ become much more significant. Figure 9 shows the effect of an announcement that the short-term nominal interest rate will be lowered by 25 basis points 4 quarter into the future. This experiment...
But Isn’t this the Interest Rate?

- The $\beta$ in front of $E_t \pi_{t+1}$ due to firm discounting of future profits.
- So, really, it is one-over the gross interest rate.
- In the standard model
  \[ (1 + r)^{-1} = \beta \]
- In the perpetual youth model (ignoring steady state inflation and growth)
  \[ (1 + r)^{-1} = \tilde{\beta} = \eta \beta \]
- So, again, it is one-over the gross interest rate that shows up as coefficient on $E_t \pi_{t+1}$
But Isn’t this the Interest Rate?

- Interest rate to calibrate to is the same no matter what $\rho$ is
- $\tilde{\beta}$ should be calibrated to match interest rate and not vary with $\rho$ ($\beta$ should vary with $\rho$ to match interest rate)
- In this case, “forward-lookingness” of all equations except consumption Euler equation will be unaffected by perpetual youth stuff
- What is left is less forward-looking consumption Euler equation
Figure 7: Forward Guidance in a Blanchard-Yaari Model: Individual vs. Aggregate Response

Notes: The figure shows impulse response functions to an anticipated drop in interest rates 10 quarters in the future. The red line shows the simulation with $p = 0.0001$ and the blue line shows the impulse responses with $p = 0.15$. 
CONCLUSION

- Very nice paper!!

- I could go on for an hour about it!