

Discussion of:  
**Estimating DSGE Models with  
Forward Guidance**  
by Kulish, Morley, and Robinson

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# Contributions

- Add forward guidance to standard DSGE model
- Bring information from long-term yields into estimation
- Estimate “shadow rate”

# Importance of forward guidance

- Policy analysis
  - Since 2008, this has been one of the main levers of monetary policy.
  - Academic work offers little quantitative advice for policymakers.
  - Hard to assess how effective policies have been ex post.
- Model misspecification
  - Standard DSGE models are not equipped to deal with this.
  - Reduced-form (VAR) models will necessarily exhibit parameter instability at the ZLB.
    - The parameters depend on the horizon of FG.

# A simple example

Consider this structural model:

$$y_t = a_0 + a_1 r_{t+1}$$

$$r_t = \max[by_t + r_t^*, 0]$$

Reduced form for  $y$ :

$$y_t = \phi_0 + \phi_1 y_{t-1} + \phi_2 r_{t-1}^*$$

But reduced-form parameters depend on whether constraint is expected to bind.

If at ZLB next period:

$$\phi_0 = a_0$$

$$\phi_1 = 0$$

$$\phi_2 = 0$$

If not:

$$\phi_0 = -a_0/a_1 b$$

$$\phi_1 = 1/a_1 b$$

$$\phi_2 = -b$$

# Modeling strategy

- The paper exploits this dependence to identify expected duration of ZLB in each period.
  - Implicitly estimates time-varying VAR parameters at the ZLB.
  - Shadow rate is computed as Taylor-rule-implied FF rate.
- Finds agents expect ZLB to bind for about 8-9 qtrs throughout most of the post-2008 period.
- Calculates a large cumulative output loss due to ZLB constraint.

# Comments

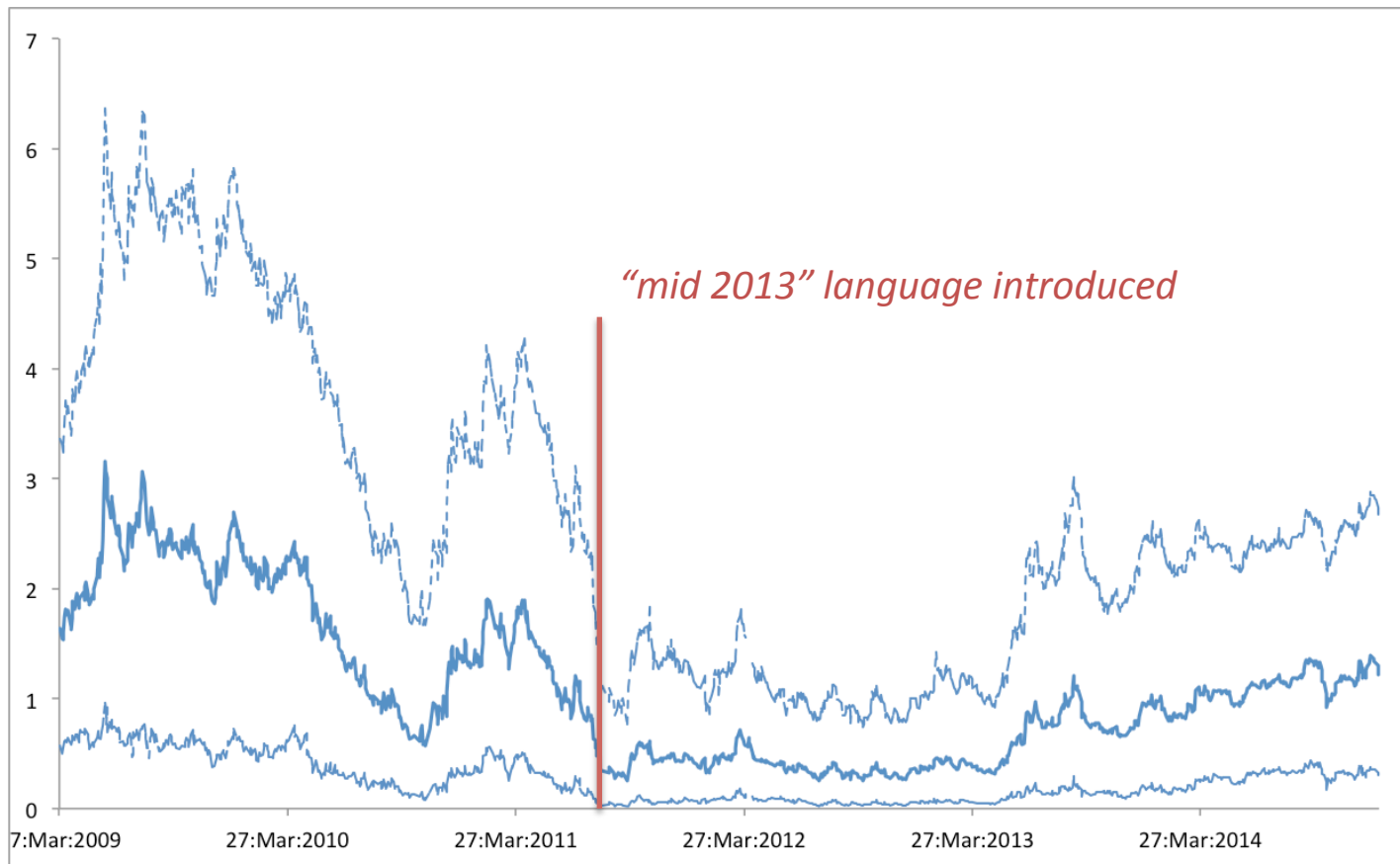
- Miscellaneous and minor:
  - Away from the ZLB agents assign zero probability to getting there.
  - Why not use observed risk premia for estimation?
  - How important is forward guidance? Could compute IRFs to a one-quarter “shock.”
  - Very negative shadow rate depends on getting the trend right.
- Not so minor:
  - Nonlinearities and second moments may matter...

# Nonlinearities (1)

- Model is log-linearized => Effectively no risk
  - Model appends shocks for risk and term premia
    - Better than nothing, but these should be endogenous.
    - May defeat the purpose of using long-term yields
    - More broadly, way in which these are modeled could matter a lot – parallel shifts?
- Second moments are always a problem for linearized DSGE models, but the issues are central in this case:
  - Crisis was *all about* risk.
  - ZLB and FG directly affect risk

# Uncertainty about future short rate

Mean and 10% - 90% CI of 2-year ahead FF rate  
from Eurodollar options



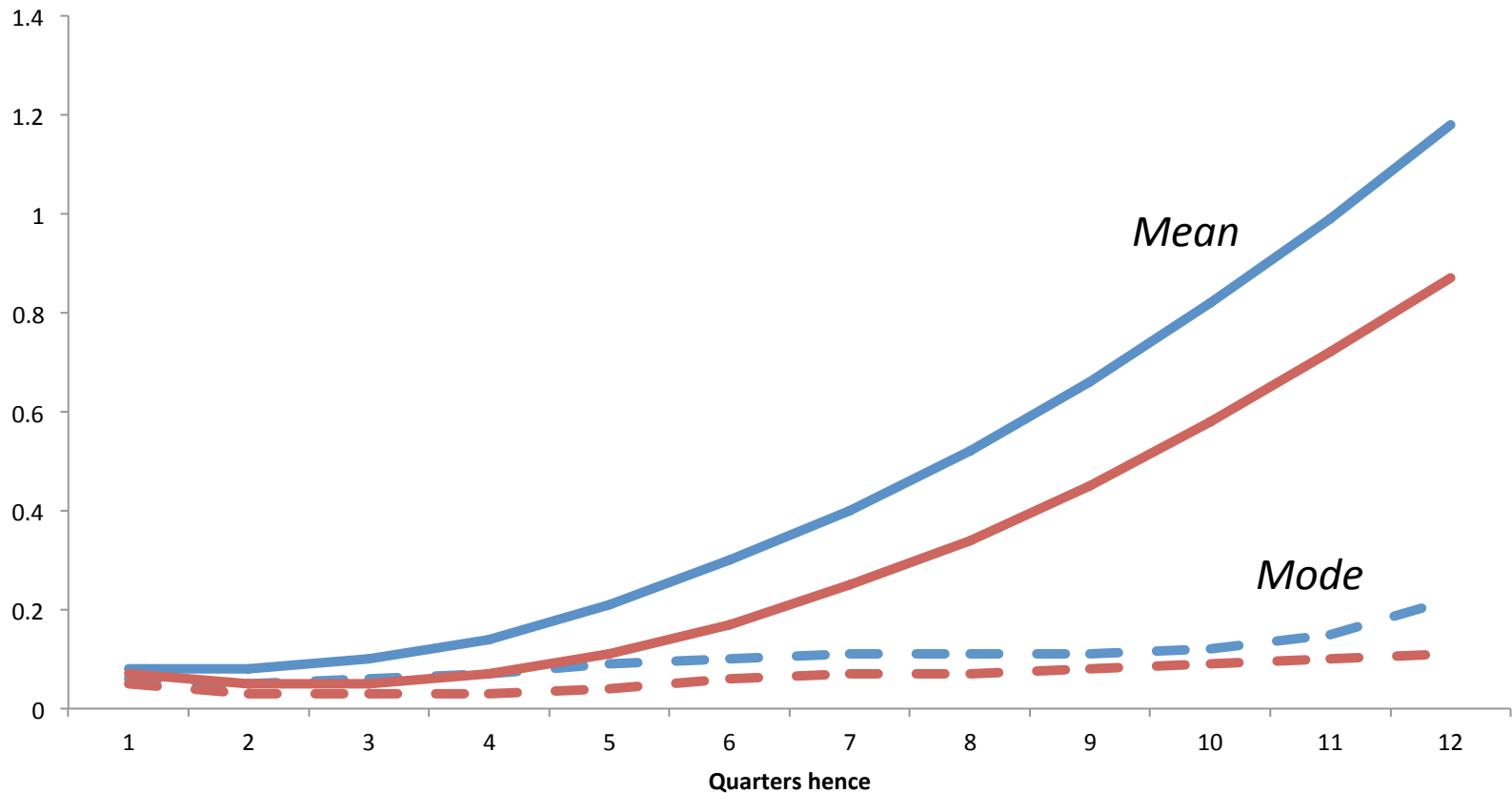


# Nonlinearities (2)

- In the model, agents' "expectations" about ZLB duration are assumed to be degenerate.
  - No uncertainty
  - This is not a second-order issue:
    - With nonlinearities, first and second moments are linked.
    - FG may work in part by reducing uncertainty about the path of rates.

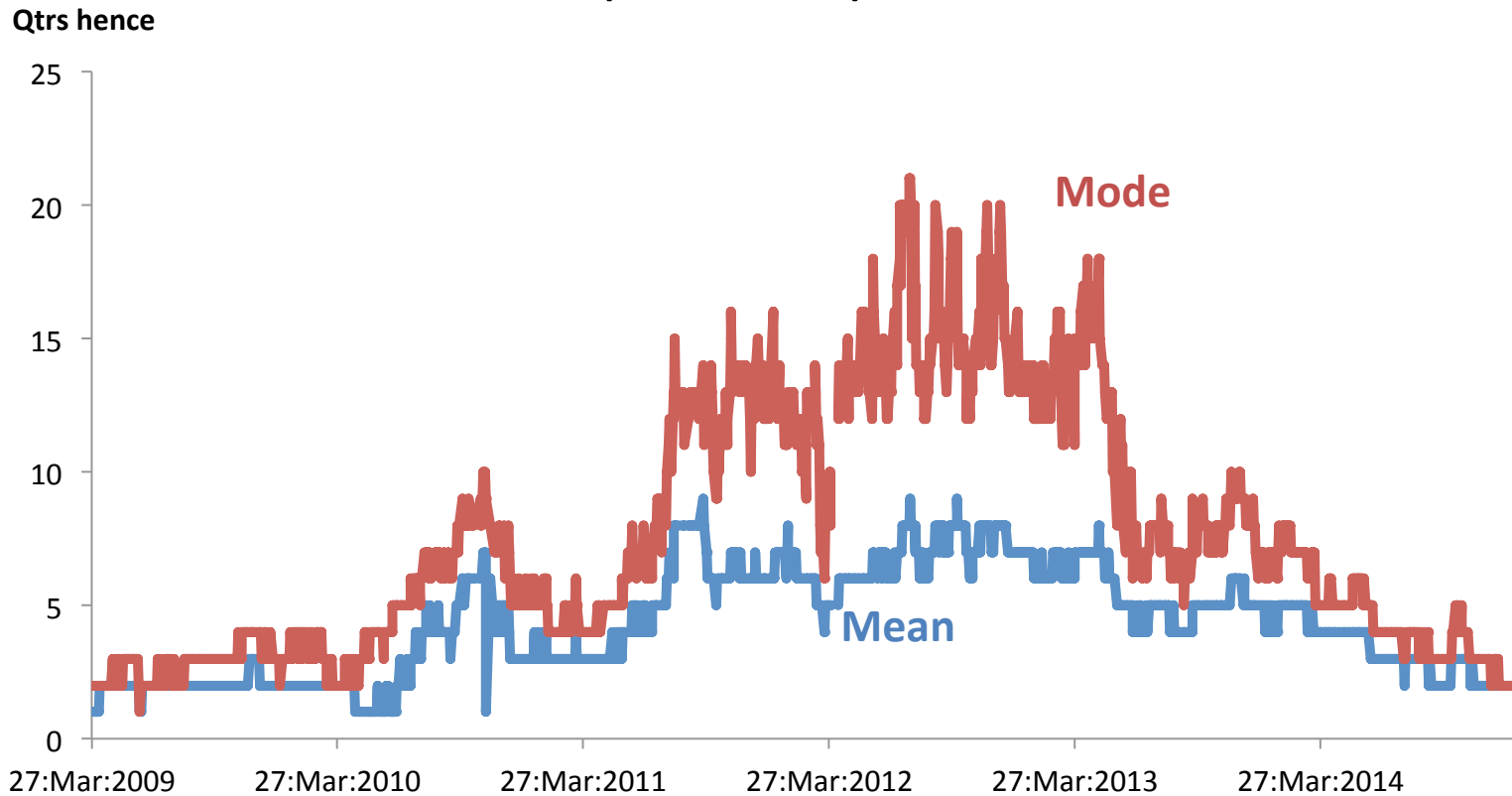
# Distribution of short rates at ZLB is not symmetric and depends on uncertainty.

Moments of FF path implied by interest rate caps  
8 Aug and 10 Aug, 2011



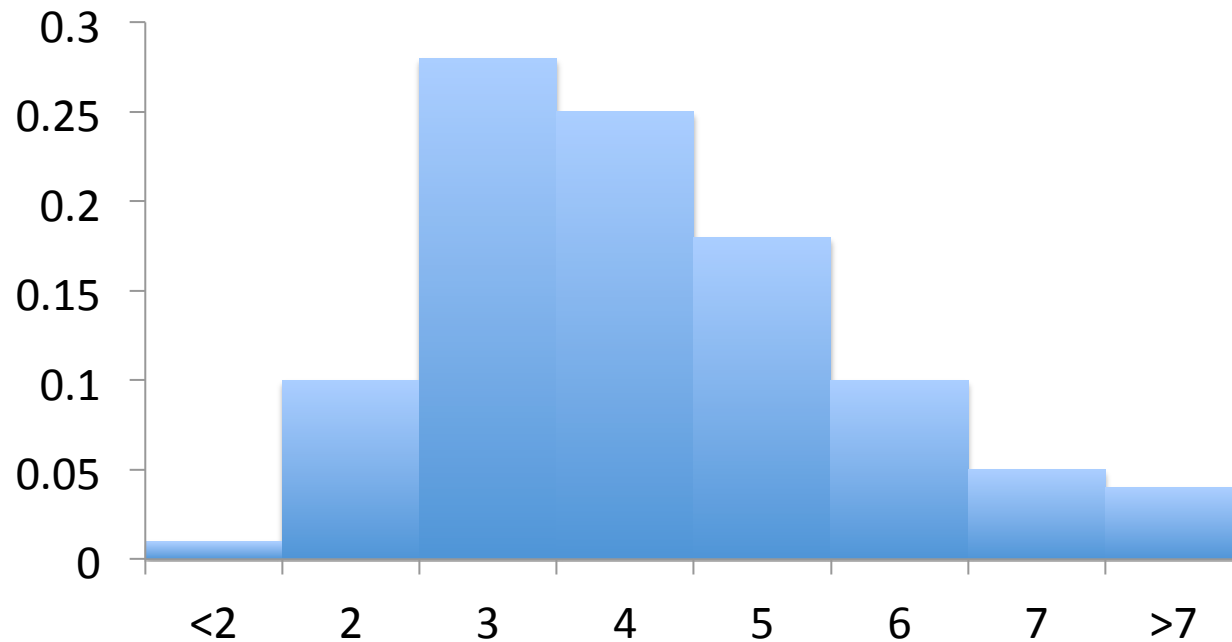
Which one of these are the authors picking up?  
Which one do they want?

Liftoff horizon implied by mean vs. mode  
caps-based paths



# Similar info from FRBNY Primary Dealer Survey

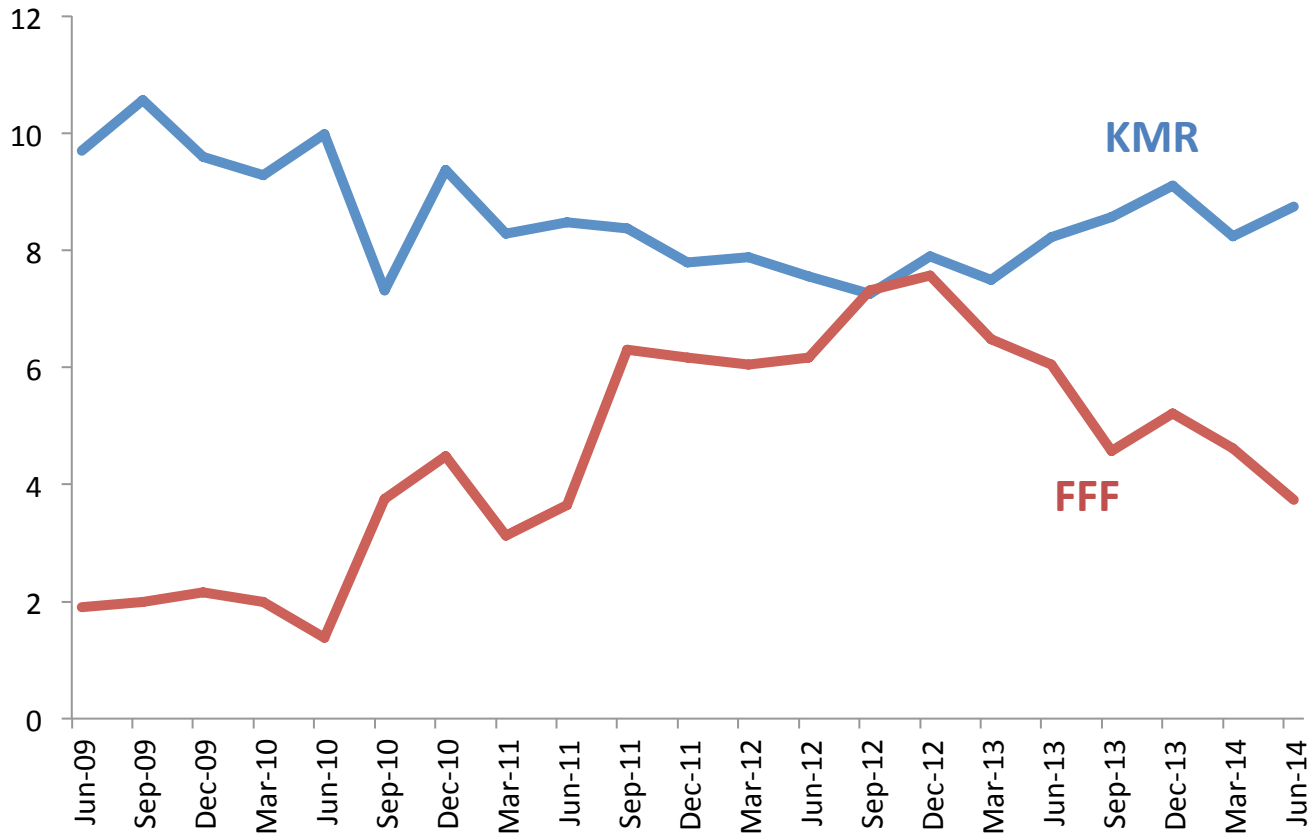
**How many quarters til liftoff?  
PDF, Oct. 2014**



# Nonlinearities (3)

- KMR estimates of ZLB duration do not vary much over time.
  - E.g., 8 qtrs at end of sample seems too long.
- Could this be because of the high sensitivity of macro data to FG in these models?

# Mean FFF path crossing horizon vs. KMR expected ZLB duration



# A possible way to sync things up

- Recall:

$$y_t = a_0 + a_1 r_{t+1}$$

$$r_t = \max\left[by_t + r_t^*, 0\right]$$

- This becomes much easier to estimate if we have data on  $E[r_{t+1}]$  directly.
- Why not incorporate survey or market data to get this?
  - At least, it could inform the priors.