Monetary Policy in a Low Interest Rate World

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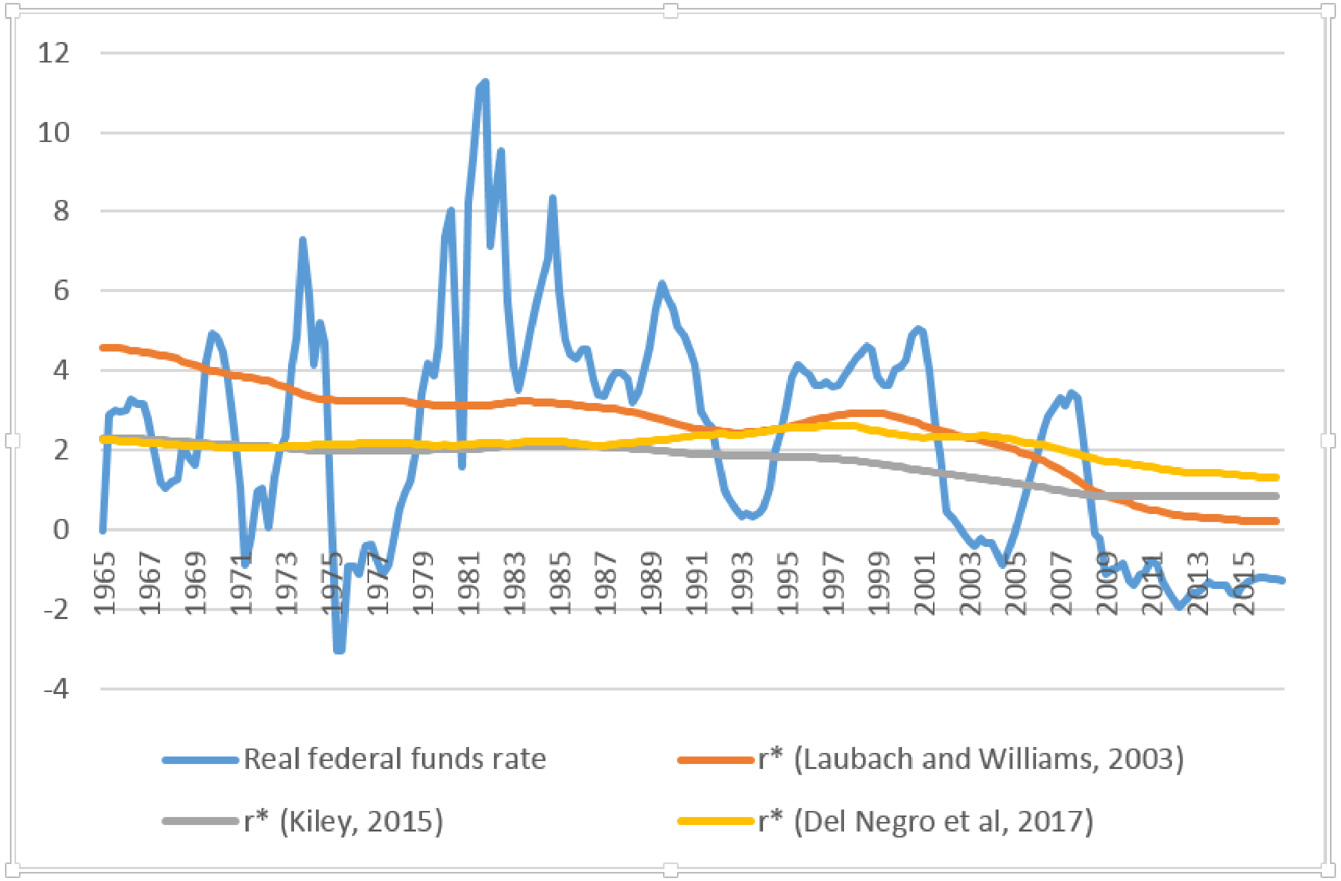
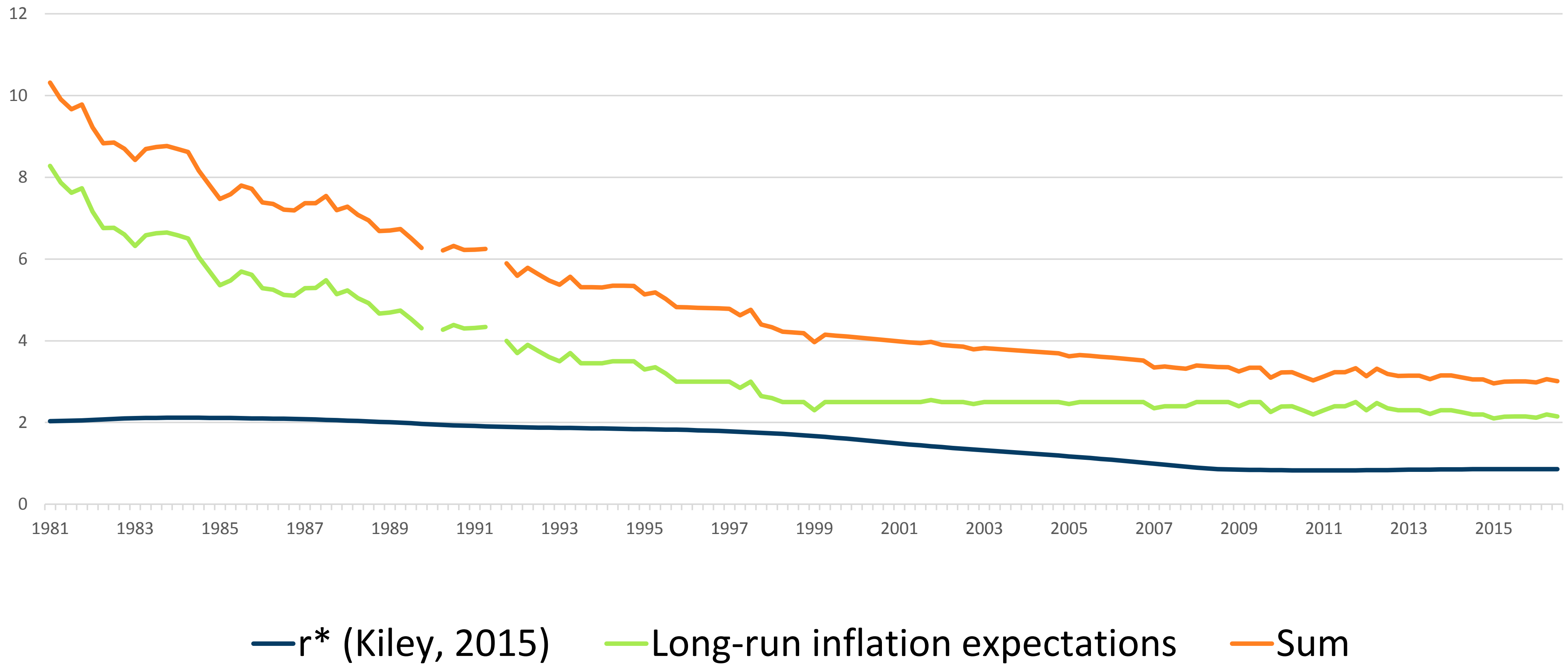
The analysis and conclusions set forth are those of the authors and do not indicate concurrence by the Federal Reserve Board or other members of its staff.

Real interest rates may stay very low…



… and nominal ones as well



The questions we ask

- If r^* is low, how often will the ELB bind?
- What are the resulting consequences for price stability and full employment?
- What policy options can ameliorate these consequences?
  - ➢ *Very similar in structure to the Levin, Wieland, and Williams study published in the Taylor (1999) conference volume.*

How we answer our questions

- Use simulations of two models:
  1. A large econometric model (FRB/US)
  2. A current vintage DSGE model (Lindé, Smets, and Wouters, 2016)
- Consider the effects of the ELB under alternative assumptions regarding *r** when the inflation target is 2 percent
- Examine alternative policy approaches:
  - “Policy as usual” before the crisis
  - Risk-adjusted policy rule
  - Commitment policies

Preview of main results

- Under traditional policy approaches, the ELB will bind often
  - And much more often than previously estimated

- Risk management approaches can ameliorate these consequences

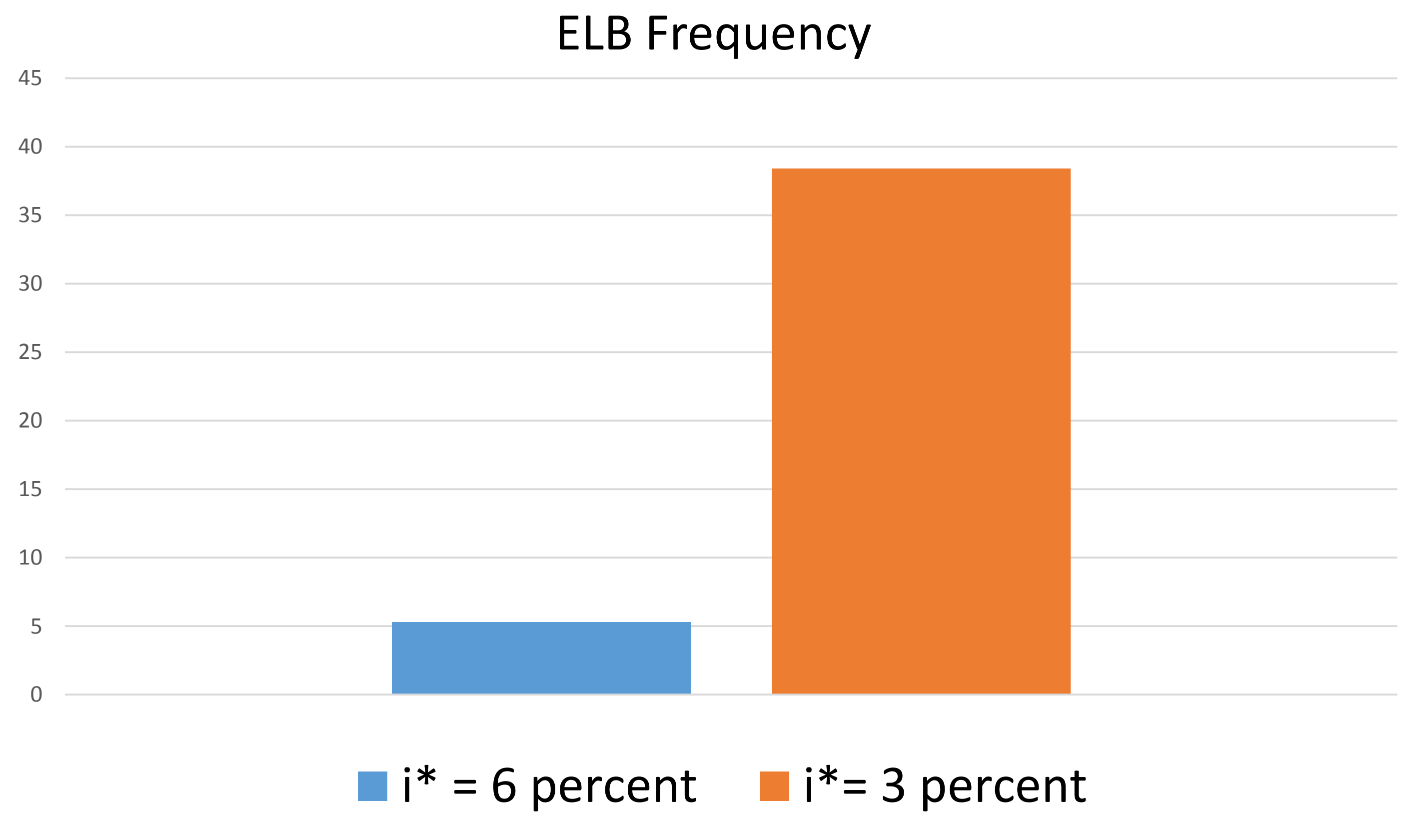
- Findings are broadly similar in the large econometric model (FRB/US) and the dynamic-stochastic-general equilibrium (DSGE) model

The models

- The DSGE model we use is representative of the literature.
  - Appeared in Handbook of Macroeconomics
- The FRB/US model is a large semi-structural model used at the Federal Reserve.
  - Includes many optimization problems but not strictly “micro-founded.”
  - Allows additional frictions: liquidity constrained households.

Results under policy as usual (simple rule)

$$i(t) = r^* + 2 + 1.5(\pi^4(t) - 2) + y(t)$$



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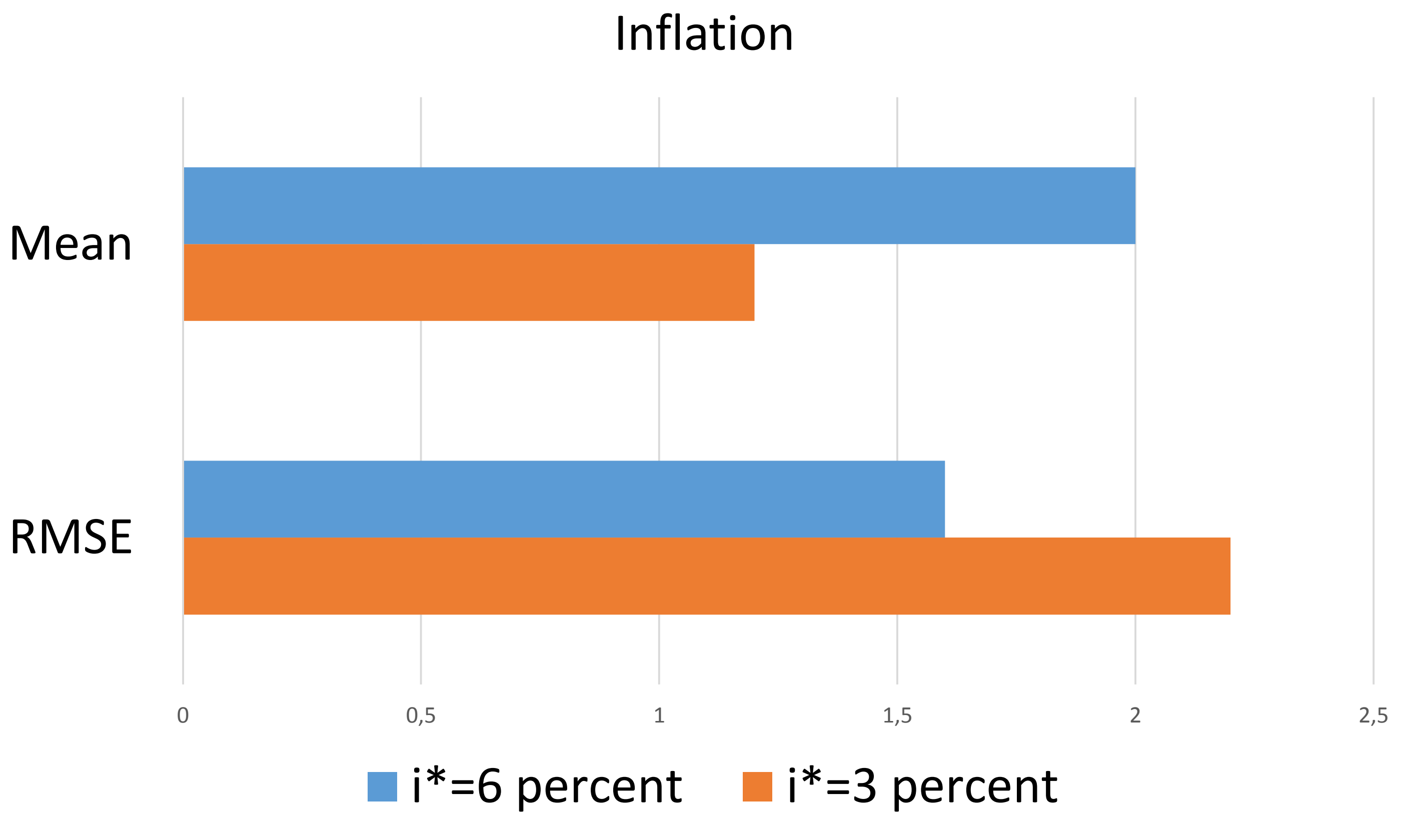

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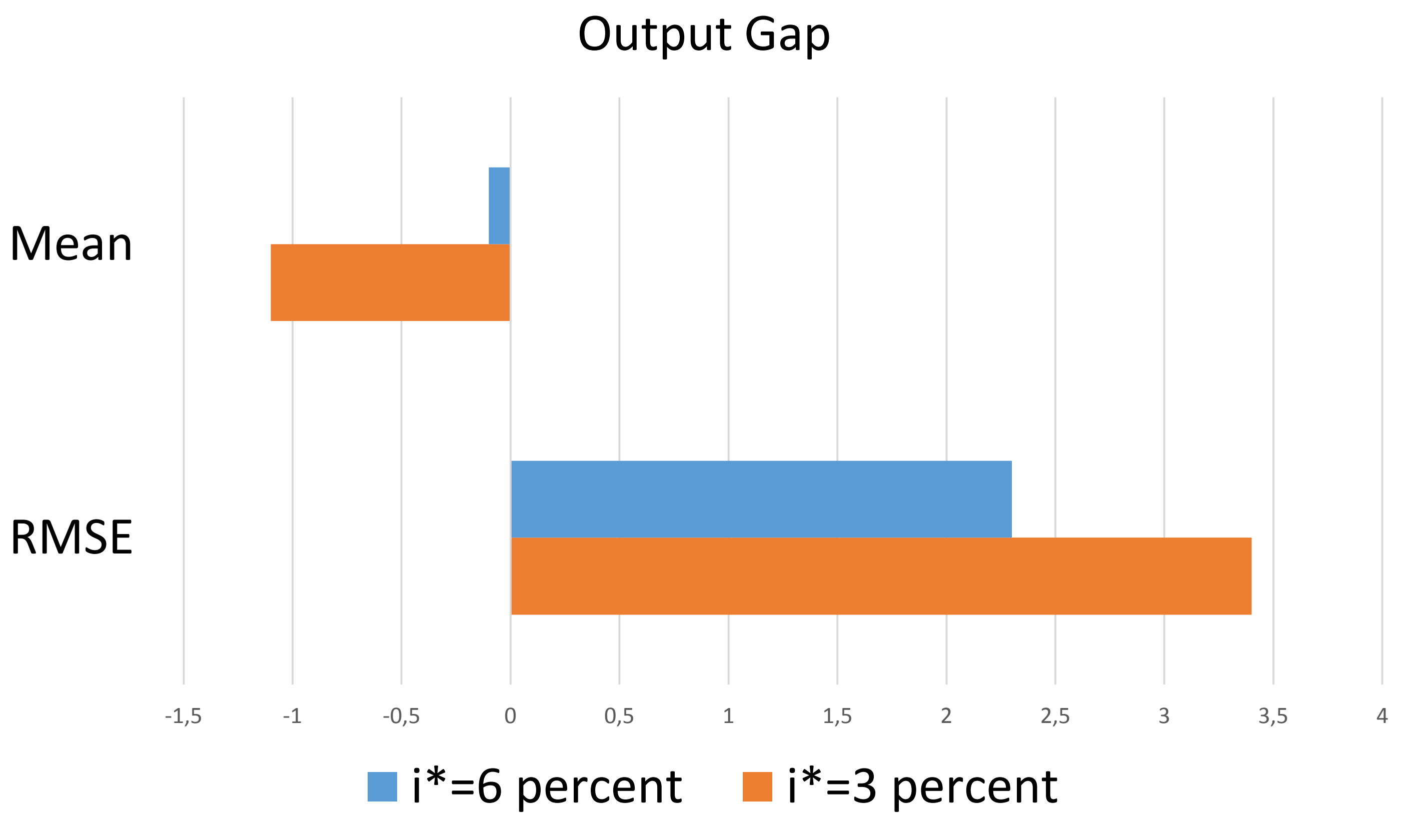
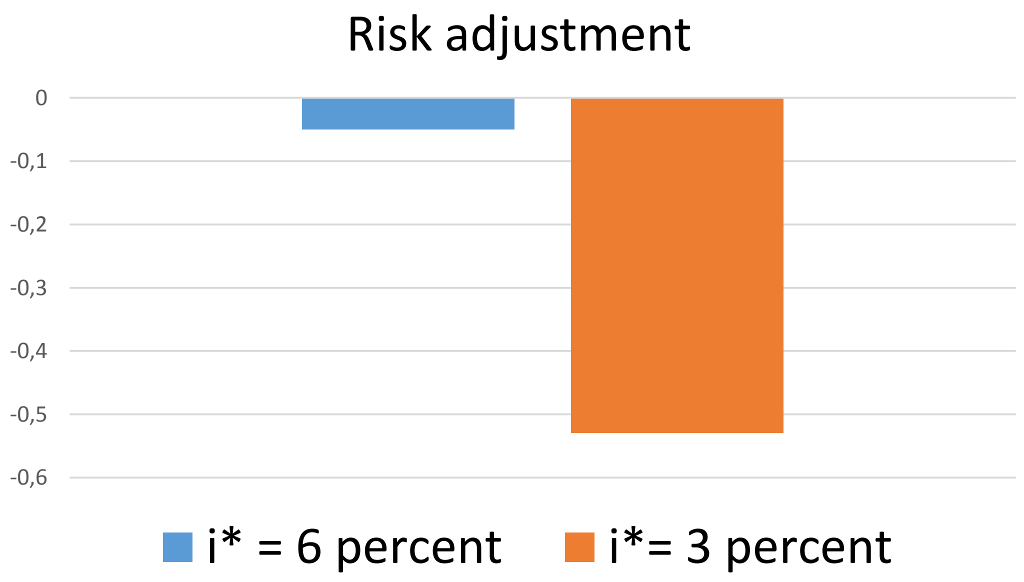
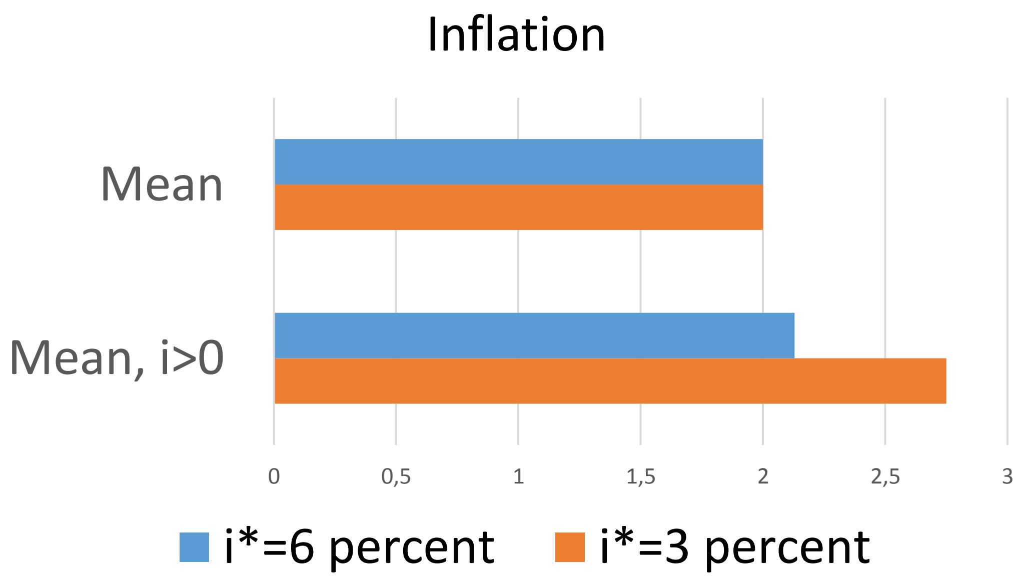


Risk management approach 1: *Risk adjustment*

$$i(t) = r^* - risk\ adjustment + 2 + 1.5(\pi^4(t) - 2) + y(t)$$





Risk adjustment – Discussion

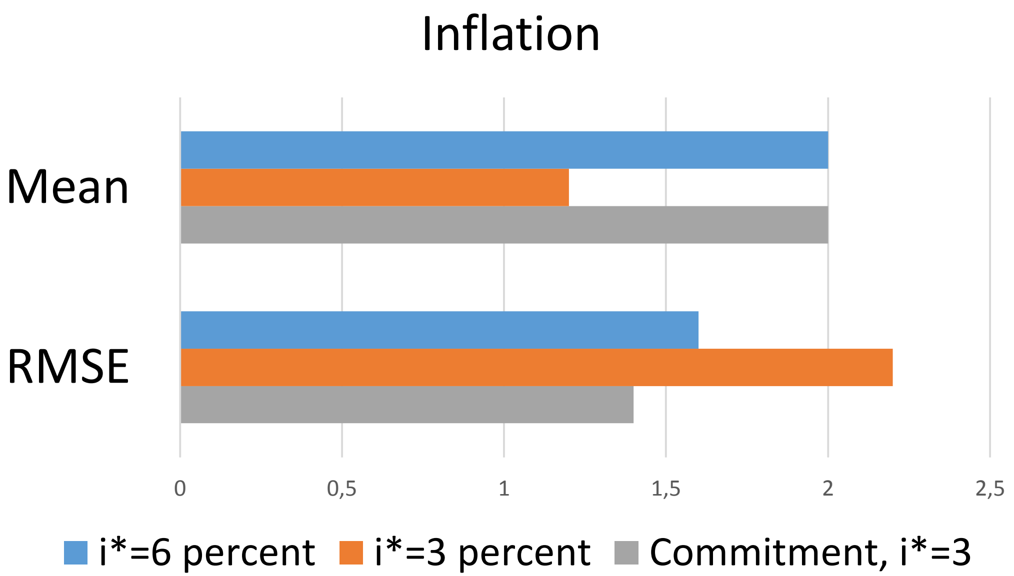
- Risk adjustment calls for a lower interest rate when away from the ELB.
- Chosen to achieve the inflation target on average.
- A risk adjustment of -50 to -100 basis points is required.
- Inflation averages close to 3 percent away from the ELB.

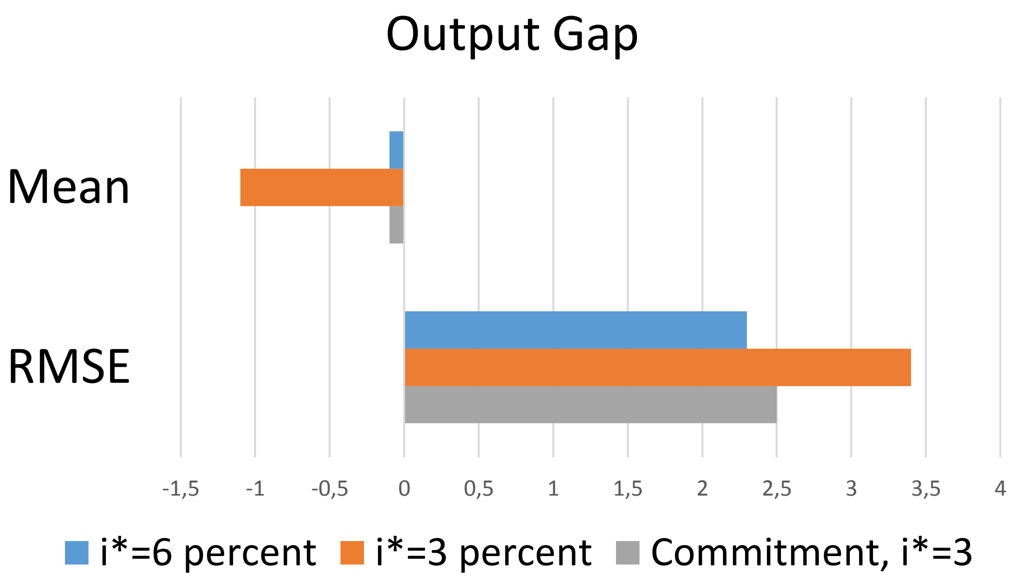
Risk management 2: *Commitments*

$$i^*(t) = i^*(t-1) + .125(\pi^4(t) - 2 + y(t)),$$
$$i(t) = \max[i^*(t), i^{ELB}]$$

- *Threshold:* Following ELB episode, $i(t)$ does not lift off zero until inflation or output exceed their objectives.
- *Shadow rate:* $i^*(t)$ keeps track of accommodation foregone because of the ELB and makes it up (Reifschneider and Williams, 2000).
- The rule is closely related to price-level targeting approaches.

Comparison: commitments and policy as usual





Commitments: Discussion

- Commitments to overshoot work well in both FRB/US and the DSGE model

- Both aspects of commitment are important
  1. The commitment not to raise rates until inflation or output overshoot (threshold-type strategy).
  2. And the commitment to make up foregone accommodation associated with $i*$

- Threshold alone is not enough.

Commitment and credibility

- Commitment isn't time consistent: If not for the past promise, would behave differently.
- Efficacy turns on whether the public believes the commitment.
- One mechanism: Central bank earns a reputation by making a commitment and following through.
- Inflation targeting presents similar challenges (Barro and Gordon, 1983).

Learning and transition

- Our simulations assume policies are well understood by public.
- Plausible when policies have been in place for some time.
- Unlikely to work as well in the immediate aftermath of an announcement.
- Transition issues are important and we have studied them in other work (Reifschneider and Roberts, 2006; Kiley 2017)
- Steady-state performance comes first: No point studying the transition to a policy that is not desirable in the long run.

Alternative: Raise inflation target

- Suggested in a number of recent pieces (Blanchard et al, 2010; Ball, 2014; and Ball, Gagnon, Honohan, and Krogstrup, 2016)
- Our work suggests that under commitment policies, the ELB imposes minimal costs. Thus, little need to raise inflation target.
- Analysis of costs and benefits of a target requires an assessment of the effects on economic performance and a welfare function
  - Our analysis only touches on some of the effects on economic performance
- More work is needed

Comparison to earlier work: FRB/US

- ELB is much more likely to bind and the effects on output and inflation are larger than in previous analyses
- Previous FRB/US analyses (Williams, 2009)
  - ELB binds 40% of time in our analysis vs less than 20% in Williams
  - Key differences:
    - Computational improvements (longer ELB episodes)
    - Williams's policy rule included a time-varying intercept that allowed more accommodation following adverse shocks
    - Changes to model do *not* account for differences

Comparison to earlier work: DSGE

- Previous DSGE work (for example, Coibion, Gorodnichenko, and Wieland, 2012) sanguine on ELB risk
- Two key differences:
    1. CGW assume a relatively “good” policy rule that, importantly, assumes commitments through shadow rates
    2. They do not consider values of low r* as low as we do.
- On an apples-to-apples basis, performance is very poor (as in our analysis)

Wrap up

- The ELB will bind very frequently (40 percent or more) if r^* is 1 percent or lower under a policy-as-usual approach
- A number of policies can improve performance; all involve higher inflation away from ELB.
- Policies work similarly in FRB/US and in the DSGE model.
- If commitment policies can be made credible, may allow better macroeconomic performance without the costs of permanently higher inflation.