

MONETARY POLICY & ANCHORED EXPECTATIONS - AN ENDOGENOUS GAIN LEARNING MODEL

Laura Gáti
Boston College

1 Puzzling Fed behavior fall 2019

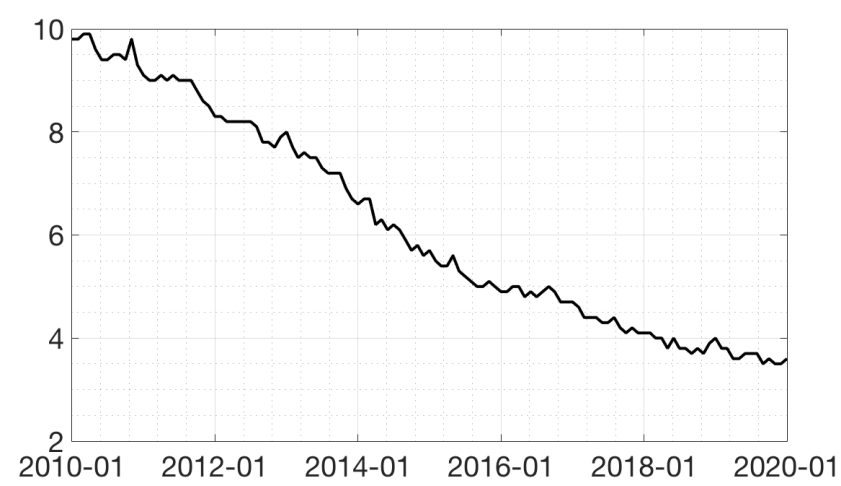


Figure 1: Unemployment rate (%)

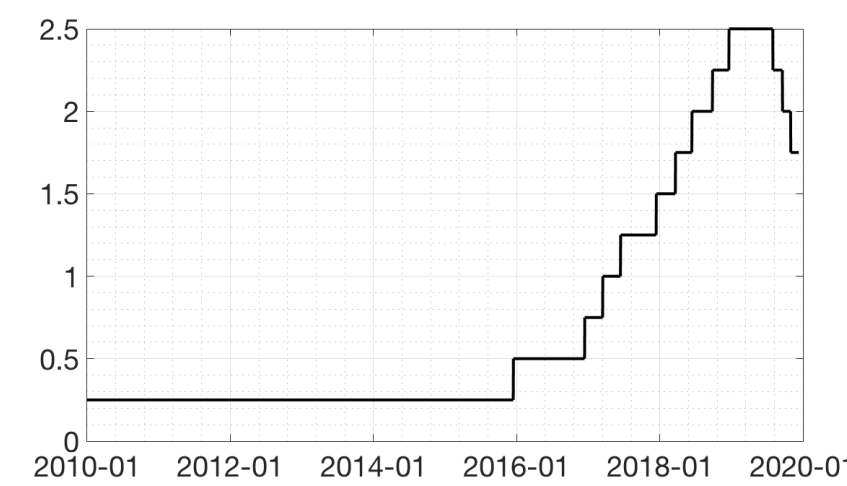


Figure 2: Fed funds rate target, upper limit (%)

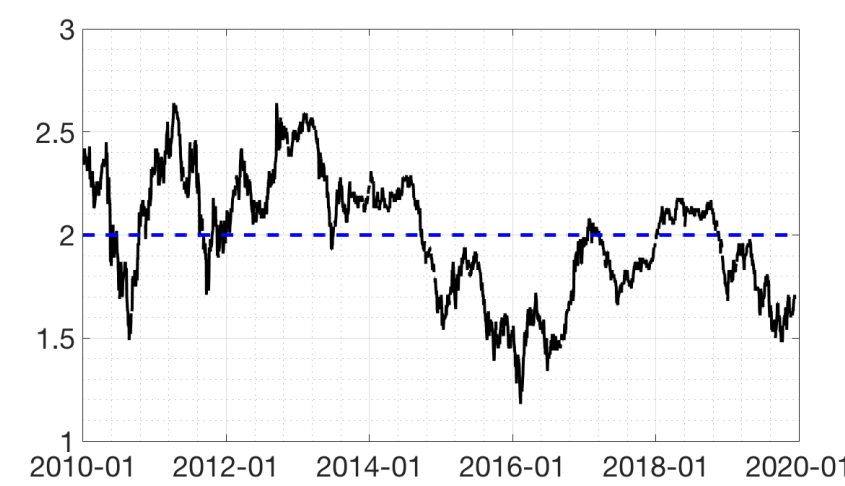


Figure 3: Market-based inflation expectations, 10 year, average (%)

2 Model with anchoring expectation formation

Macro model with Calvo nominal friction: standard up to expectation formation ($\hat{\mathbb{E}}$)

2.1 Expectation formation

- Model solution under rational expectations (RE)

$$s_t = h s_{t-1} + \epsilon_t \quad \epsilon_t \sim \mathcal{N}(\mathbf{0}, \Sigma) \quad (1)$$

$$y_t = g s_t \quad (2)$$

- Here: private sector does not know $g \rightarrow$ estimate using (1) & observed states
- Households and firms don't know they are identical
- Special case: private sector doesn't know long-run mean of inflation:

$$\hat{\mathbb{E}}_t \pi_{t+1} = \bar{\pi}_{t-1} + g_1 h_1 s_t \quad (3)$$

- Updates estimate of mean inflation using recursive least squares

$$\bar{\pi}_t = \bar{\pi}_{t-1} + k_t \underbrace{(\pi_t - (\bar{\pi}_{t-1} + b_1 s_{t-1}))}_{\equiv f e_{t|t-1}, \text{ forecast error}} \quad (4)$$

2.2 Anchoring mechanism

Endogenous gain as anchoring mechanism:

$$k_t = k_{t-1} + g(f e_{t|t-1}) \quad (5)$$

2.3 Aggregate laws of motion

IS- and Phillips curve

$$x_t = -\sigma i_t + \hat{\mathbb{E}}_t \sum_{T=t}^{\infty} \beta^{T-t} ((1-\beta)x_{T+1} - \sigma(\beta i_{T+1} - \pi_{T+1}) + \sigma r_T^n) \quad (6)$$

$$\pi_t = \kappa x_t + \hat{\mathbb{E}}_t \sum_{T=t}^{\infty} (\alpha\beta)^{T-t} (\kappa\alpha\beta x_{T+1} + (1-\alpha)\beta\pi_{T+1} + u_T) \quad (7)$$

3 Ramsey policy under anchoring expectation formation

Result 1 Target criterion under anchoring

$$\pi_t = -\frac{\lambda_x}{\kappa} \left\{ x_t - \frac{(1-\alpha)\beta}{1-\alpha\beta} \left(k_t + ((\pi_t - \bar{\pi}_{t-1} - b_1 s_{t-1})) \mathbf{g}_{\pi,t} \right) \right.$$

$$\left. \left(\mathbb{E}_t \sum_{i=1}^{\infty} x_{t+i} \prod_{j=0}^{i-1} (1 - k_{t+1+j} - (\pi_{t+1+j} - \bar{\pi}_{t+j} - b_1 s_{t+j}) \mathbf{g}_{\pi,t+j}) \right) \right\}$$

\rightarrow Two layers of novel intertemporal tradeoffs: can postpone intratemporal tradeoff

Result 2 For any adaptive learning scheme, the discretion and commitment solutions of the Ramsey problem coincide. The solution qualitatively resembles discretion and is thus not subject to the time inconsistency problem.

Implementation?

- Need for feedback rules
- Form of feedback rule? Model suggests

$$i_t = \mathbf{f}(\pi_t, k_t, \bar{\pi}_{t-1}; t) \quad \text{nonlinear}$$

\rightarrow Explains deviations from Taylor rule

\rightarrow Interesting to assess Taylor rule as approximation to optimal rule

\hookrightarrow Might do better than under RE since commitment plan not feasible here

- Optimal Taylor rule less aggressive on inflation than under RE