

SYSTEMATIC MONETARY POLICY APPROACH TO TAYLOR RULE

Alexander Vlasov (avlasov@nes.ru)

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Available at <https://github.com/avlsv/CheckingHank>

RESEARCH QUESTION

SYSTEMATIC MONETARY POLICY IDENTIFICATION

Monetary Policy Rule Counterfactuals

- McKay and Wolf (2023); Barnichon and Mesters (2023) use the identified shocks and impulse responses to them to minimize a loss function.

FOMC Preferences

- Hack, Istrefi, and Meier (2023) use Istrefi (2019) data on preferences of FOMC members and using the FOMC rotation mechanism they are able to construct an IV.

EMPIRICAL APPROACH

STATE-DEPENDENT LP MODEL

Based on method of Hack, Istrefi, and Meier (2023).

I assume that the monetary policy rule is

$$(r - r^*)_{t+h} = \phi_t^h \mathbb{E}[\pi_{t+1} \mid \mathcal{J}_t] + \psi_t^h \mathbb{E}[x_{t+1} \mid \mathcal{J}_t] + \varepsilon_t.$$

$\mathbb{E}_t \pi_{t+1}$ and $\mathbb{E}_t x_{t+1}$ are the expectations of monetary authority about inflation and output gap.

STATE-DEPENDENT LP MODEL [2]

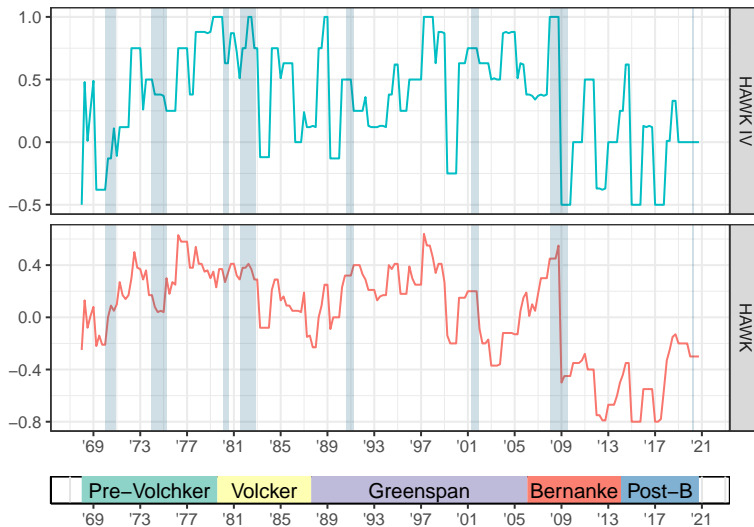
Then I estimate the following State-Dependent LP-IV.

$$\begin{aligned}(r - r^*)_{t+h} = & \alpha^h + \beta_{\pi}^h \hat{\pi}_t + \gamma_{\pi}^h \hat{\pi}_t (Hawk_t - \overline{Hawk}) \\ & \beta_u^h \hat{x}_t + \gamma_u^h \hat{x}_t (Hawk_t - \overline{Hawk}) \\ & + \delta^h (Hawk_t - \overline{Hawk}) + \zeta^h Z + e_{t+h}^h,\end{aligned}$$

where

- $Hawk_t$ is the Hack, Istrefi, and Meier (2023) index of [FOMC hawkishness](#) based on Istrefi (2019) estimate of preferences of each FOMC member.
- $\hat{\pi}_t$ is the FOMC (Tealbook) projection of future [inflation](#).
- \hat{x}_t is the FOMC (Tealbook) projection of future [output gap](#).

HAWK AND HAWK IV INDEXES FROM HACK, ISTREFI, AND MEIER (2023)



SHORT AND LONG MODELS

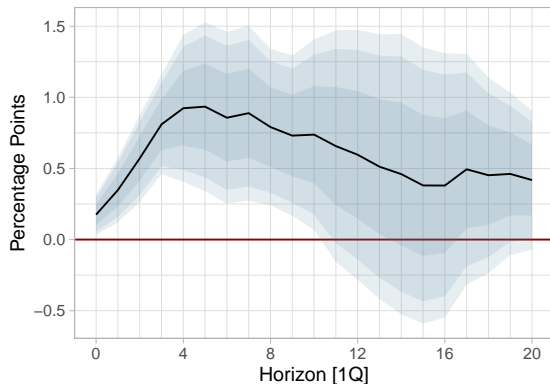
- Contemporaneous Tealbook projections of **CPI inflation** and **GDP gap** are available starting from **1979 Q4** and **1987 Q3**, respectively.
- Tealbook projections are available up to **2018 Q4** due to the publication lag.
- That leaves only 126 quarters (122 obs if one wants to include 4 quarter-lags).

In order to increase the number of observation, I introduce Long model.

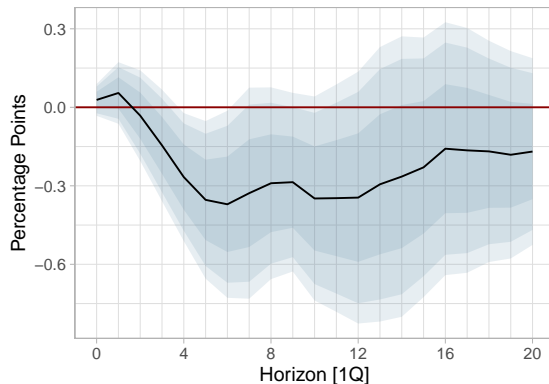
Model	Tealbook Projected ...	
	Inflation	Output Gap
Short	CPI Inflation	GDP Gap
Long	Deflator Inflation	Unemployment Gap

SHORT MODEL. $r - r^*$ RESPONSE TO PROJECTED CPI INFLATION

(a) Average Resp. to Projected CPI Inflation



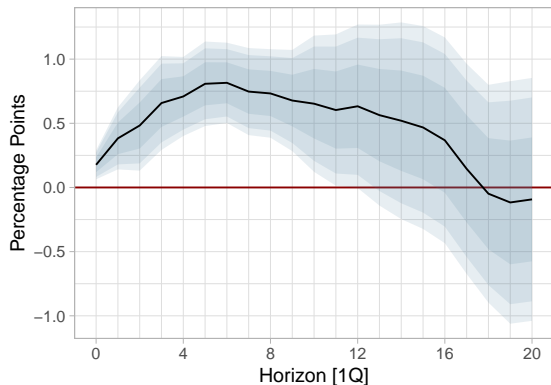
(b) Differential Resp. to Projected CPI Inflation



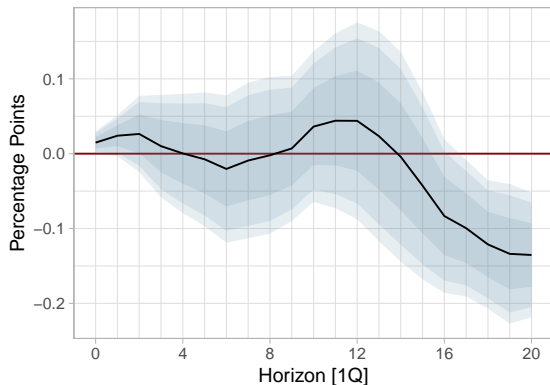
Notes: This figure reports the responses of the $(r - r^*)_t$ to an increase in the Tealbook CPI inflation projection and GDP gap projection of 1 p.p. The subfigure 1a reports the response of $(r - r^*)_t$ to projected CPI inflation for the *HAWK* index equal to the sample average; 1b is the addition to the response in case there are 2 (out of 12 in total) additional consistent hawks in the FOMC. The shaded areas correspond to 68%, 90% and 95% confidence intervals calculated with Andrews (1991) HAC estimator.

SHORT MODEL. $r - r^*$ RESPONSE TO PROJECTED GDP GAP

(a) Average Response to Projected GDP Gap



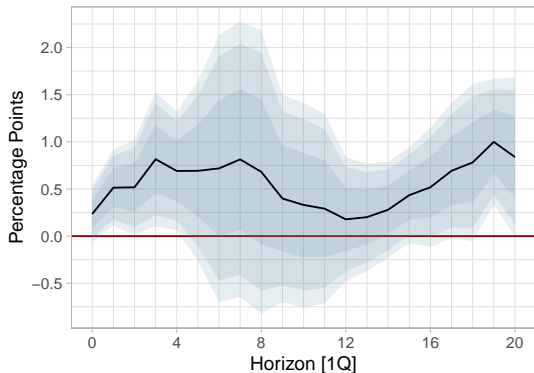
(b) Differential Response to Projected GDP Gap



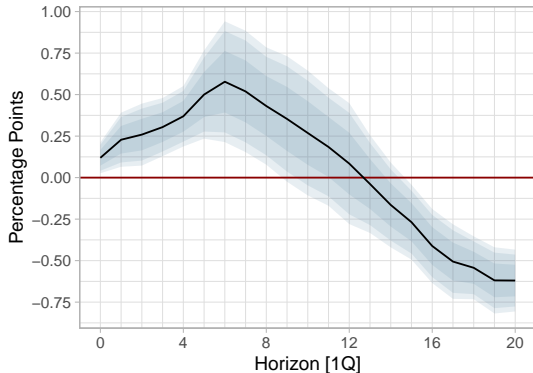
Notes: This figure reports the responses of the $(r - r^*)_t$ to an increase in the Tealbook GDP gap projection of 1 p.p. The subfigure 2a reports the response of $(r - r^*)_t$ to projected output gap increase for the *Hawk* index equal to the sample average; 2b is the addition to the previous response in case there are 2 (out of 12 in total) additional consistent hawks in the FOMC. The shaded areas correspond to 68%, 90% and 95% confidence intervals calculated with Andrews (1991) HAC estimator.

LONG MODEL. $r - r^*$ RESPONSE TO PROJECTED DEFLATOR INFLATION

(a) Average Response to Deflator Inflation



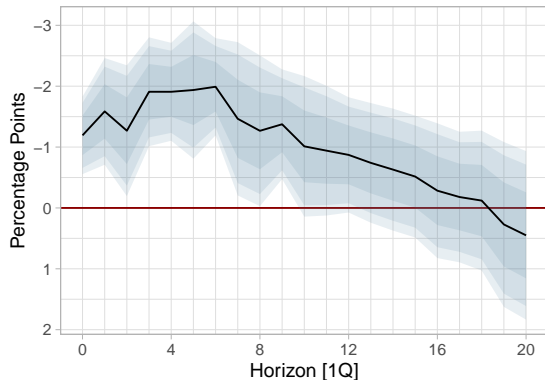
(b) Differential Response to Deflator Inflation



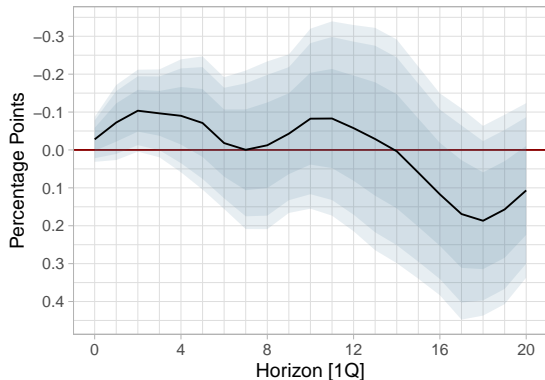
Notes: This figure reports the responses of the $(r - r^*)_t$ to an increase in the Tealbook GDP gap projection of 1 p.p. The subfigure 3a reports the response of $(r - r^*)_t$ to projected deflator inflation increase of 1 p.p. for the *Hawk* index equal to the sample average; 3b is the addition to the previous response in case there are 2 (out of 12 in total) additional consistent hawks in the FOMC. The shaded areas correspond to 68%, 90% and 95% confidence intervals calculated with Andrews (1991) HAC estimator.

LONG MODEL. $r - r^*$ RESPONSE TO PROJECTED UNEMPLOYMENT GAP

(a) Average Response to Unemployment Gap



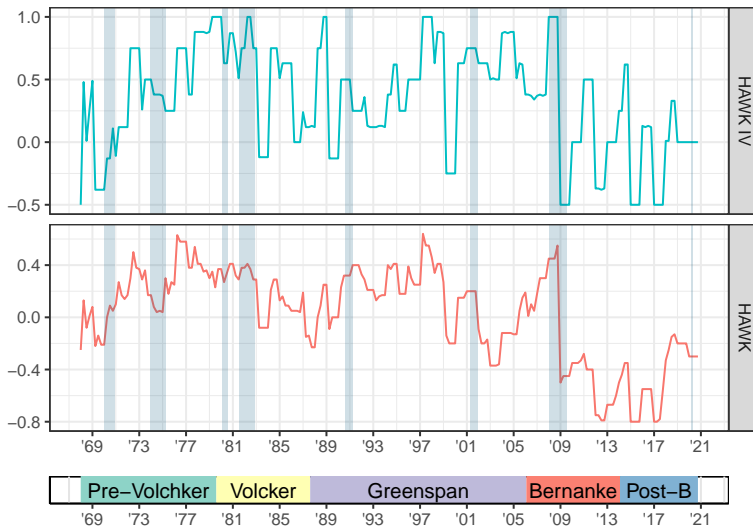
(b) Differential Response to Unemployment Gap



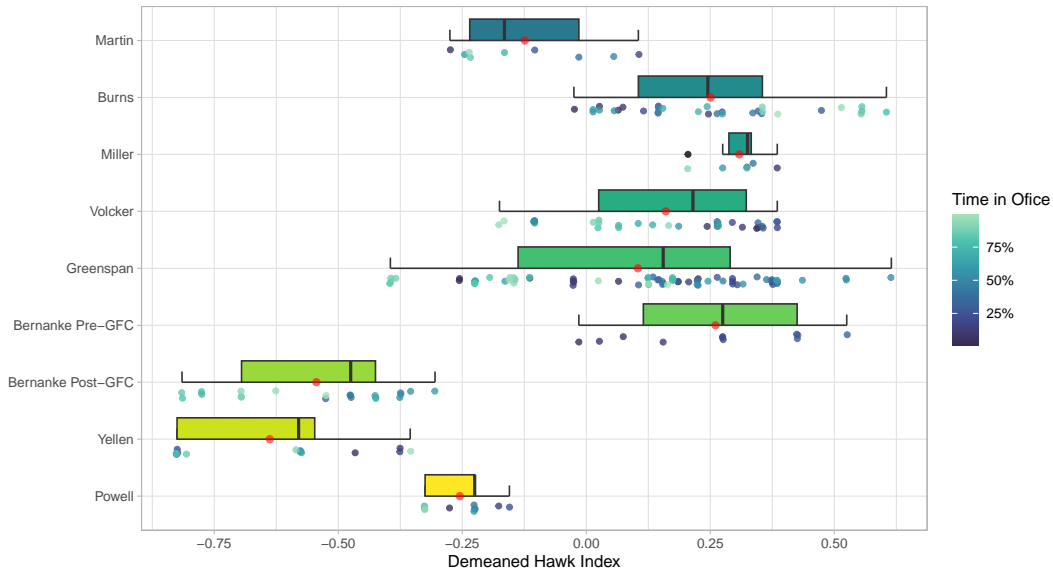
Notes: This figure reports the responses of the $(r - r^*)_t$ to an increase in the Tealbook GDP gap projection of 1 p.p. The subfigure 4a reports the response of $(r - r^*)_t$ to projected output gap increase for the *Hawk* index equal to the sample average; 4b is the addition to the previous response in case there are 2 (out of 12 in total) additional consistent hawks in the FOMC. The shaded areas correspond to 68%, 90% and 95% confidence intervals calculated with Andrews (1991) HAC estimator.

COMBINED IRF

HAWK AND HAWK IV INDEXES FROM HACK, ISTREFI, AND MEIER (2023)



HAWK INDEX DISECTED BY FED CHAIR

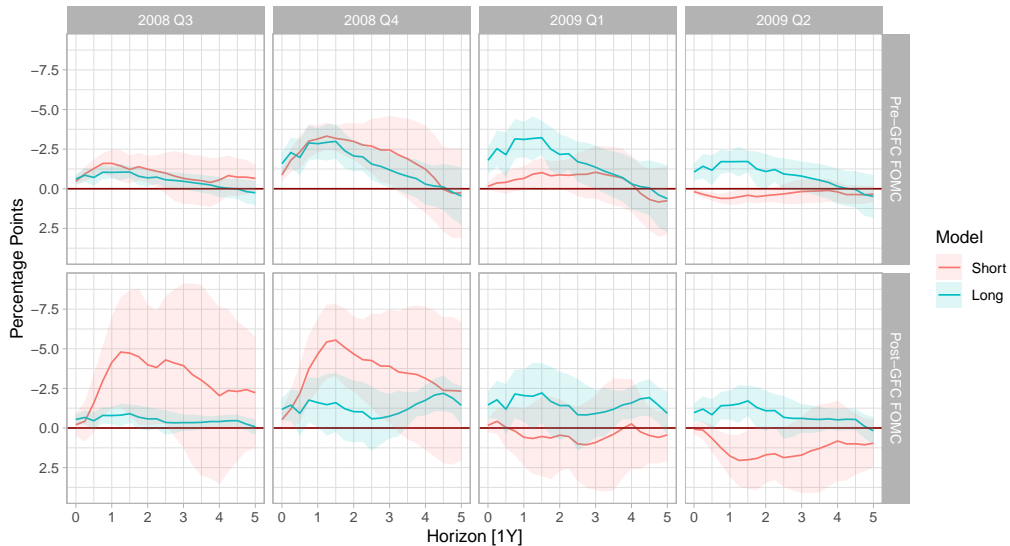


SHOCKS AND HAWK

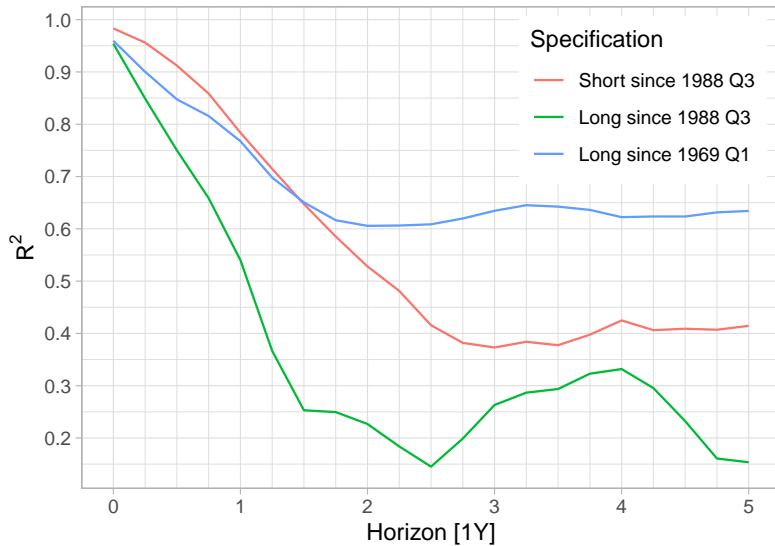
Shocks

		Δ CPI inflation	Δ GDP gap	Δ Deflator inflation	Δ Unemployment gap
1	2008 Q3	-2.40	0.05	-0.05	0.49
2	2008 Q4	-1.45	-3.03	-0.57	1.14
3	2009 Q1	1.18	-2.05	-0.40	1.36
4	2009 Q2	1.10	-0.21	0.03	0.87

IRFS TO

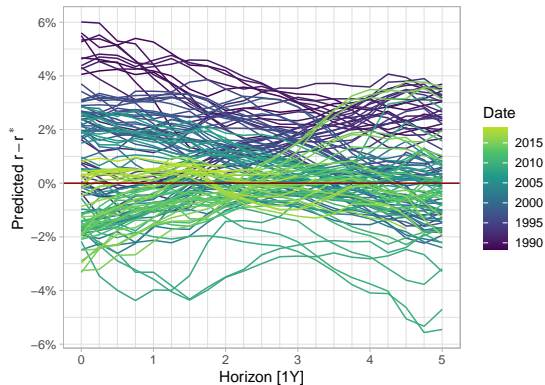
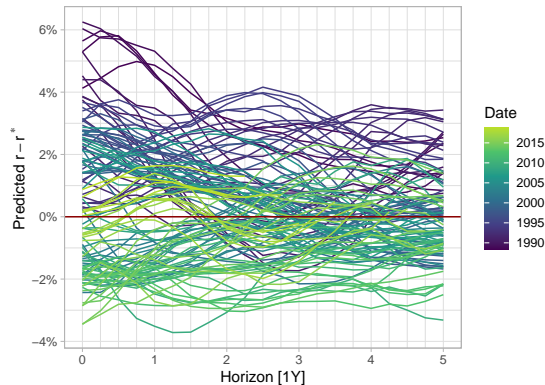


IN-SAMPLE PREDICTIVE ABILITY



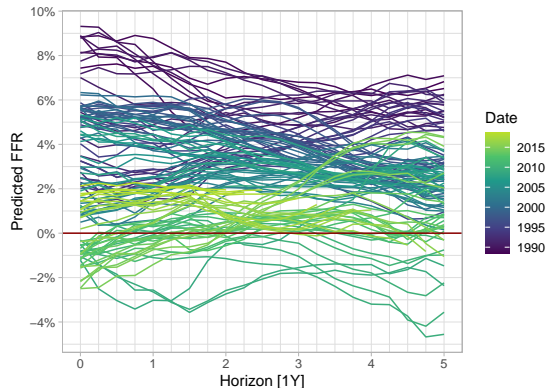
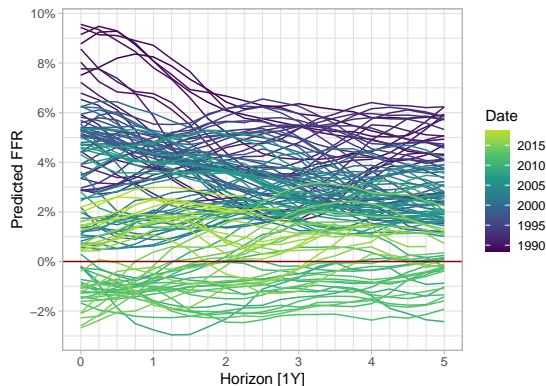
ESTIMATES OF LIQUIDITY PREMIA

IN-SAMPLE PREDICTED $r - r^*$ PATHS

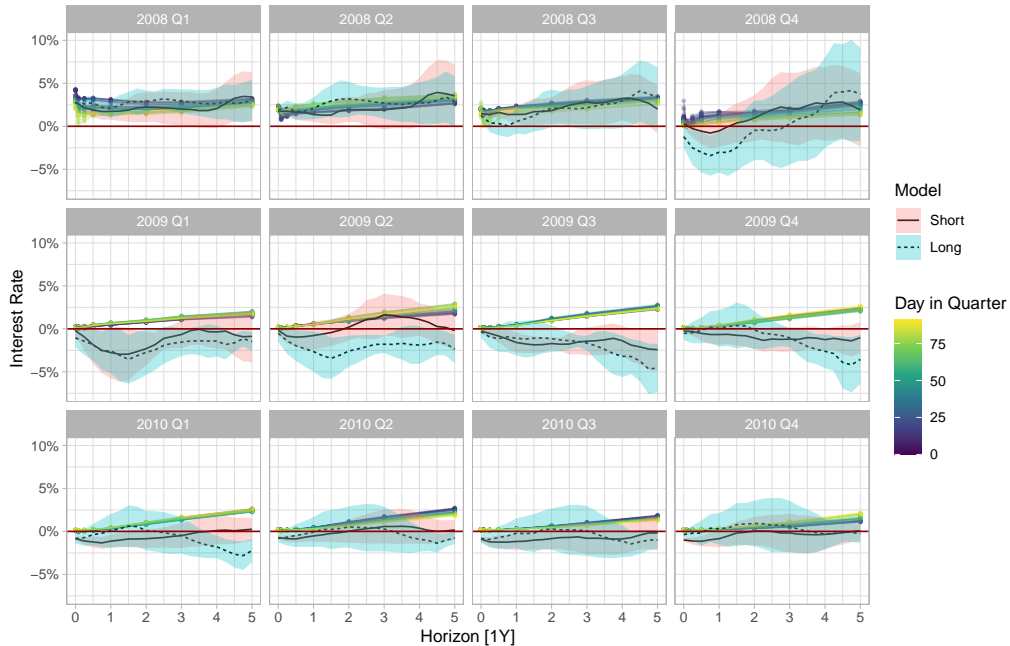


Notes: This figure shows the predictions of $r - r^*$ paths in each state calculated by short and long models.

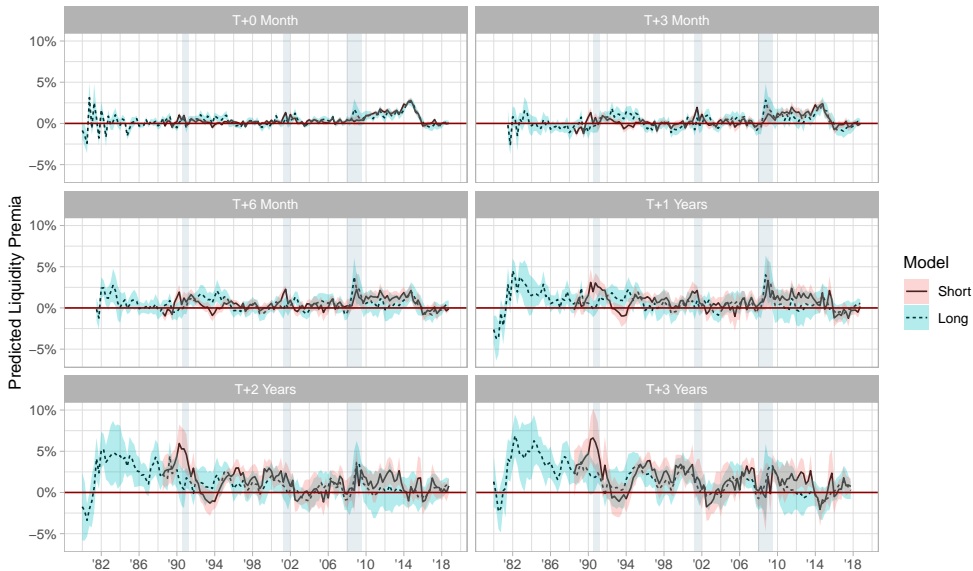
IN-SAMPLE PREDICTED FFR PATHS



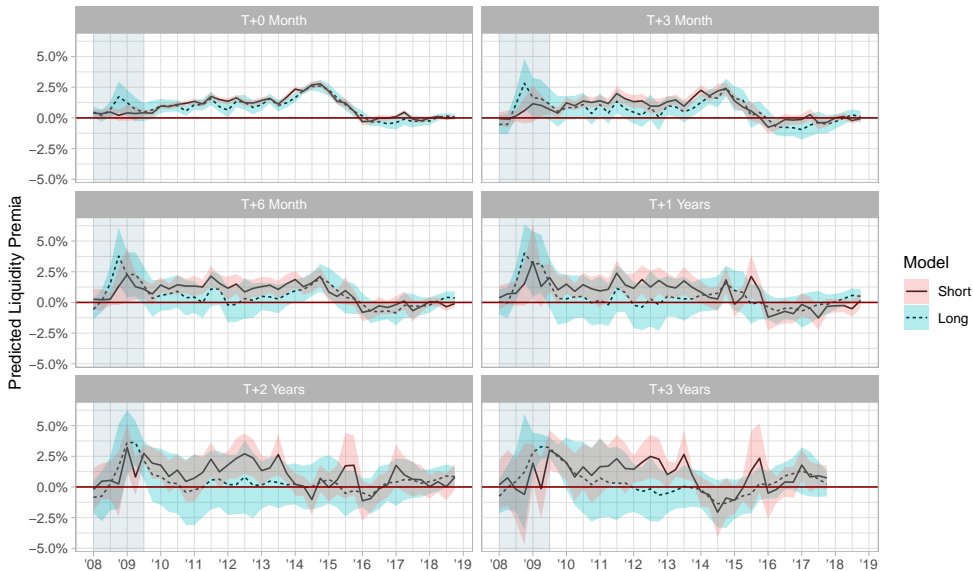
Notes: This figure shows the predictions of r paths in each state calculated by short and long models.



ESTIMATES OF LIQUIDITY PREMIA



ESTIMATES OF LIQUIDITY PREMIA ZOMMED TO 2008-2019



SIZE-PERSISTENCE ESTIMATIONS

OUTCOMES OF KAPLAN, MOLL, AND VIOLANTE (2018) MODEL

Kaplan, Moll, and Violante (2018) Tradeoffs in HANK model:

1. **Size-Persistence Tradeoff:** Cumulative elasticity of aggregate consumption declines with the increase of persistence of monetary policy path in a nonlinear manner.
2. **Inflation-Output Tradeoff:** the same Taylor rule shocks lead to the increased effects in Inflation-Output tradeoff.

SIZE-PERSISTENCE IN RANK

Rate path:

$$r_t = \rho + \underbrace{\exp(-\eta t)}_{\text{Persistence}}(r_0 - \rho).$$

NK consumption policy

$$C_0 = \bar{C} \exp \left(-\frac{1}{\gamma} \int_0^\infty (r_s - \rho) ds \right).$$

Size:

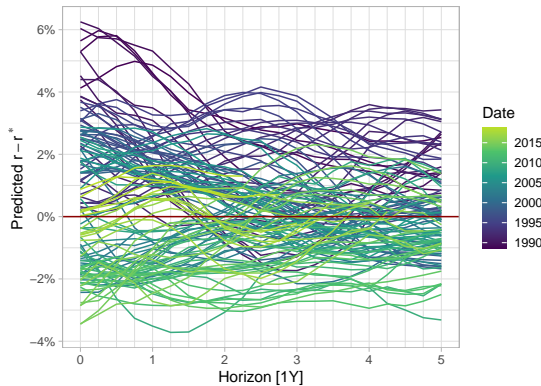
$$R_0 = \int_0^\infty (r_s - \rho) ds,$$

No Size-Persistence tradeoff in RANK:

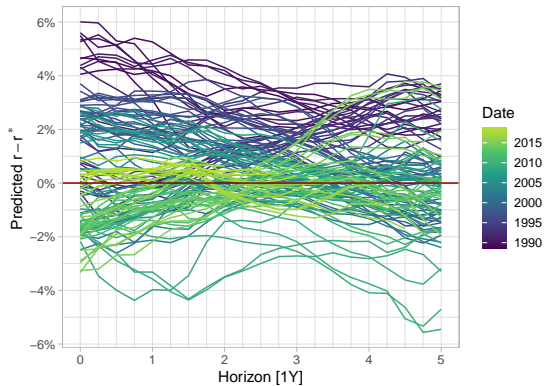
$$\frac{-d \log C_0}{dR_0} = \frac{1}{\gamma}.$$

PREDICTED $r - r^*$ PATHS

(a) Short Model



(b) Long Model



Notes: This figure shows the predictions of $r - r^*$ paths in each state calculated by short and long models.

ESTIMATION OF SIZE AND PERSISTENCE

Size in Kaplan, Moll, and Violante (2018) is

$$Size_t = \frac{1}{H} \sum_{h=0}^H (\widehat{r - r^*})_{t+h}$$

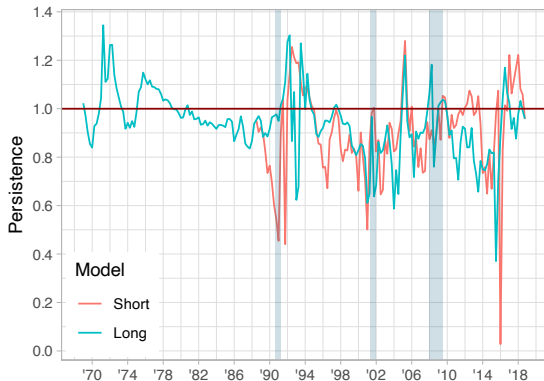
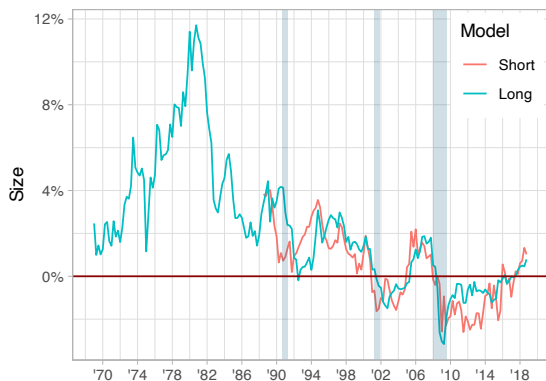
$$(\widehat{r - r^*})_{t+h} = \exp(\mu_t h) (\widehat{r - r^*})_t \exp(\varepsilon_t)$$

This can be rewritten as

$$\log \left(\frac{(\widehat{r - r^*})_{t+h}}{(\widehat{r - r^*})_t} \right) = \mu_t h + \varepsilon_{th}$$

And persistence is $Persistence = \exp(\hat{\mu}_t)$.

ESTIMATES OF SIZE OVER TIME



Notes: This figure presents the size and persistence, calculated as mean and the first autocorrelation of impulse-response function in each state, constructed as described in section 2 on page 28, over time.

SIZE-PERSISTENCE ESTIMATES

Estimates of Size and Persistence

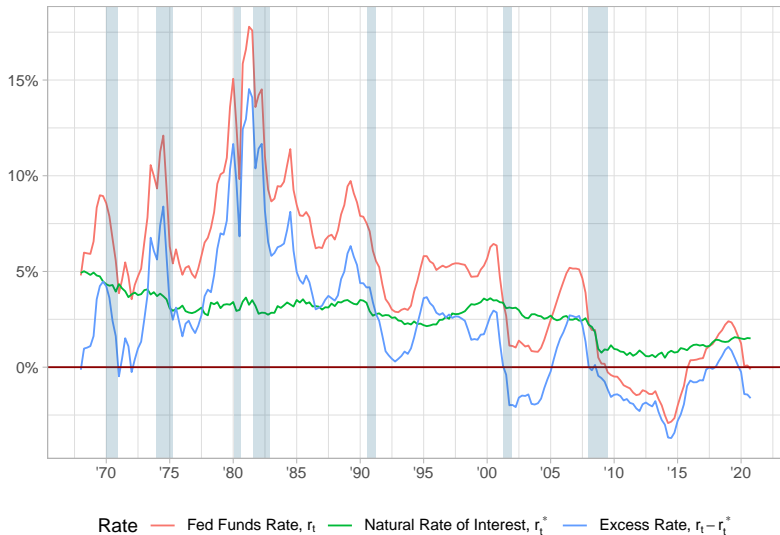


Notes:

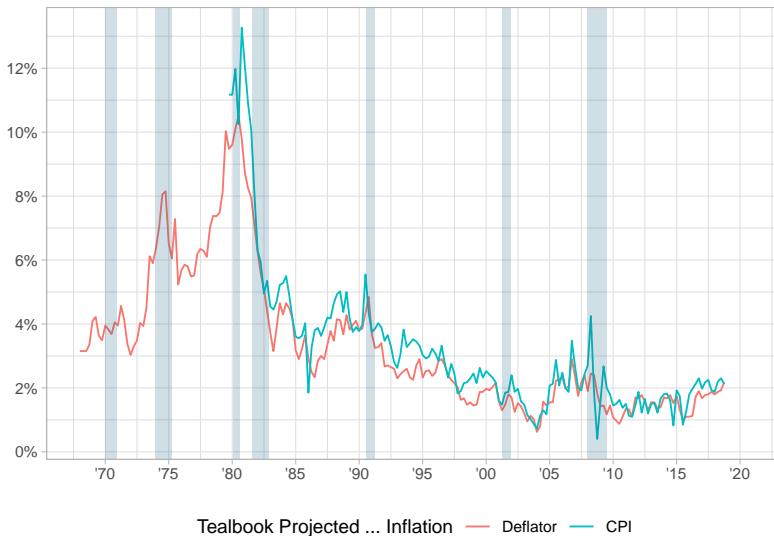
DATA

- Projections of FED inflation (deflator, and CPI), GDP gap, unemployment and NAIRU are from Tealbook (average of 1 and 2 quarter quarters ahead following Coibion and Gorodnichenko (2011) and averaging of FOMC meetings per quarter).
- HAWK index from Hack, Istrefi, and Meier (2023).
- Natural rate of interest by Holston, Laubach, and Williams (2017); Holston, Laubach, and Williams (2023).
- Short-term rate (r) is Fed Funds Rate and Wu and Xia (2016) shadow rate.

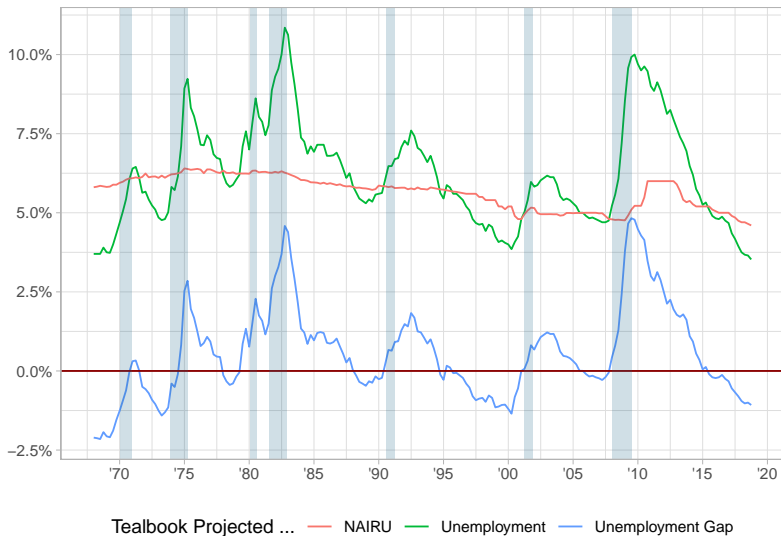
RATES



TEALBOOK INFLATION PROJECTIONS







TEALBOOK UNEMPLOYMENT PROJECTIONS







TEALBOOK OUTPUT GAP PROJECTIONS



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