DISCUSSION
“In search of a nominal anchor: What drives long-term inflation expectations?”
by Carvalho, Eusepi, Moench, and Preston

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The results presented here do not necessarily represent the views of the Federal Reserve System or the Federal Open Market Committee

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### Key question

What drives long-run inflation expectations?

### This paper

- State-dependent sensitivity of $\pi_t$ to incoming data
- Learning with “SS bands” for updating behavior
- Induces *endogenous* variations in trend inflation
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**Great Paper!**
AGENDA

1. The Problem (a.k.a. the motivation)
2. The Paper (a.k.a. the solution)
3. The Praise (a.k.a. my thoughts)
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• ...the extent to which they are anchored can change, depending on economic developments and (most important) the current and past conduct of monetary policy.
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• If, ... the public reacts to ... higher-than-expected inflation by marking up their long-run expectation considerably, then expectations are poorly anchored.
SPF LONG-RUN EXPECTATIONS
Average PCE inflation over next 10 years, mean response

- 10
- 5
0
5
10

REALIZED INFLATION AND SPF

black: inflation, red: SPF-10Y, blue: 12m-inflation
REALIZED INFLATION AND SPF
black: inflation, red: SPF-10Y, blue: EWMA
TREND INFLATION 101

**EWMA Trend is your Friend**

\[ \tau_{t|t} = (1 - K)\tau_{t-1|t-1} + K\pi_t \]

- simple filter for persistent component
- Muth (1961, ECA): Optimal filter in “local level model”!

**Local level / UC model**

\[ \pi_t = \tau_t + \tilde{\pi}_t \quad \tau_t = \tau_{t-1} + \eta_t \quad \tilde{\pi}_t \sim m.d.s. \]

econometrician’s BN-trend: \[ \tau_{t|t} = E(\pi_{t+\infty}|\pi^t, \ldots) \]

UC BN-trend: \[ \tau_t = E(\pi_{t+\infty}|\tau^t, \ldots) \]
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Local level / UCSV model

\[ \pi_t = \tau_t + \tilde{\pi}_t \quad \tau_t = \tau_{t-1} + \sigma^\eta_t \eta_t \quad \tilde{\pi}_t \sim m.d.s. \]

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- UC BN-trend: \[ \tau_t = E(\pi_{t+\infty}|\tau^t, \ldots) \]
TIME-VARYING EWMA WEIGHT: “UCSV”
Stock and Watson (2006, JMCB): $\partial \pi_{t+\infty}/\partial e_t = K_t$
MULTIVARIATE TREND ESTIMATES

$\tau_t | \text{(trimmed CPI etc.)}$, from Mertens (REStat, forth.)

MULTIVARIATE TREND ESTIMATES
\( \tau_t \mid (\text{trimmed CPI etc.}), \tau_t \mid (\text{SPF etc.}) \) from Mertens (REStat, forth.)

![Graph showing trend estimates from 1960 to 2015 with SRV and INFTRM lines.]
MULTIVARIATE TREND ESTIMATES

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## Ingredients

- DSGE model with NK-Phillips Curve
- Twist: Learning with “SS bands” for updating:

$$
\bar{\pi}_t = (1 - k_{t-1}^{-1}) \bar{\pi}_{t-1} + k_{t-1}^{-1} \left( \pi_t - (\hat{E}_{t-1} \pi_t - \bar{\pi}_{t-1}) \right)
$$

$$
k_t = \begin{cases} 
  k_{t-1} + 1, & \text{if } |\Phi(\text{past FE})| < \nu \\
  \bar{g}^{-1}, & \text{otherwise}
\end{cases}
$$

## Endogenous data feeds into learning behavior

- Endogenous trend
- State-dependent sensitivity of trend, $\bar{\pi}_t$, to data
- Once anchored, can tolerate deviations of inflation from trend up to a point
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“Exogenous” vs “endogenous” trend:

1. $\bar{\pi} = E_t\pi_{t+\infty}$ vs $\bar{\pi}_t = \hat{E}_t\pi_{t+\infty}$
2. $\tau_t$ vs $\tau_{t|t}$
SKETCH OF AN ALTERNATIVE MODEL

**NK Phillips Curve**

\[ \tilde{\pi}_t = \beta \tilde{\pi}_{t+1|t} + \kappa x_t + u_t \]
\[ \tilde{\pi}_t = \pi_t - ((1 - \gamma) \tau + \gamma \pi_{t-1}) \]

**Monetary policy with inflation target \( \tau \)**

\[ i_t = \bar{r}_t + \tau + \phi_\pi (\pi_t - \tau) + \phi_x x_t + \varepsilon_t \]
SKETCH OF AN ALTERNATIVE MODEL
elements from Ireland (2000, JMCB)

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elements from Ireland (2000, JMCB), Erceg & Levin (2003, JME), etc.

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Public has limited information

\[ \pi_{t+1|t} = E(\pi_{t+1|Z^t} : Z_t = [\pi_t \ x_t \ i_t \ ...]) \]
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Simulate with \( K \neq 0 \) while \( \text{Vol}(\eta_t) = 0? \)
SOME THOUGHTS

1. “Exogenous” vs “endogenous” trend:
   - $\bar{\pi} = E_t \pi_{t+\infty}$ vs $\bar{\pi}_t = \hat{E}_t \pi_{t+\infty}$
   - $\tau_t$ vs $\tau_t|t$

2. True end-point of inflation:
   - Does DGP satisfy $\frac{1}{T} \sum_t \pi_t \to E(\pi_t) = \bar{\pi}$?
   - What is your estimate?
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   Which size/kind of structural shock (and policy response) makes updating behavior switch?
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4. Fitting long-term forecasts:
   Suppose survey forecasts and inflation are cointegrated. “Close” fit better than mimicking same low-frequency behavior?
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