Is Trend Inflation at Risk of Becoming Unanchored?

The Role of Inflation Expectations in a Model of Trend Inflation

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Trend Inflation: A Measure of Underlying Longer-Run Anchor

- Evolution of aggregate consumer prices moved swiftly **from concerns about deflation to fears about excessive inflation**
- Hard to find a parallel in the history of U.S. economy–or global economy–to this **rapid reversal of risks** to inflation outlook
- **Trend inflation: reflects the public confidence** in the central bank's commitment to price stability

Trend Inflation Model: Economic Intuition

- **Underlying inflation trend informed by inflation expectation surveys:**
  Affected by ***beliefs*** about the conduct of monetary policy

- **Trend inflation**:
  - ◇ “Stable" measure of inflation expectations over a period far enough in future
  - ◇ Dominated by the central bank’s commitment rather than cyclical factors
  - ◇ Takes signal from past inflation, trimmed-mean inflation, and short- and long-term survey expectations or forecasts

- **First- and second-order anchoring**:
  Allows quantification of “level de-anchoring" and “uncertainty" in long-term inflation expectations

Trend Inflation Model: Statistical Definition

- Monthly model for the United States, borrowed from Mertens (2016), and updated through March 2022

- **Definition** of trend inflation τ_t:

  Infinite-horizon forecast of inflation π_t conditional on information set Ω_t

- **Formally**:
  - *Trend is the infinite-horizon forecast:* $\tau_t = \mathbb{E}\left(\pi_{t+\infty}|\Omega_t\right)$
  - *Absorbs new information:* $\mathbb{E}\left(\pi_{t+\infty}|\Omega_t\right) - \mathbb{E}\left(\pi_{t+\infty}|\Omega_{t-1}\right) = \tau_t - \tau_{t-1}$
  - *Trend is a random walk:* $\tau_t = \tau_{t-1} + \bar{\epsilon}_t$
  - *Actual inflation is the trend + stationary component:* $\pi_t = \tau_t + \tilde{\pi}_t$

- **Interpretation:**
  - Absence of shocks: $\bar{\epsilon}_t = 0$, trend in **stable**
  - Sizeable shocks: trend drifts away, risk of **de-anchoring**

The Set of Observable Variables

- **Past inflation:**

  Actual inflation rates, changes in CPI and PCE indexes, and GDP deflator

- **Trimmed-mean inflation:**

  Median and trimmed measures of CPI and PCE realized inflation

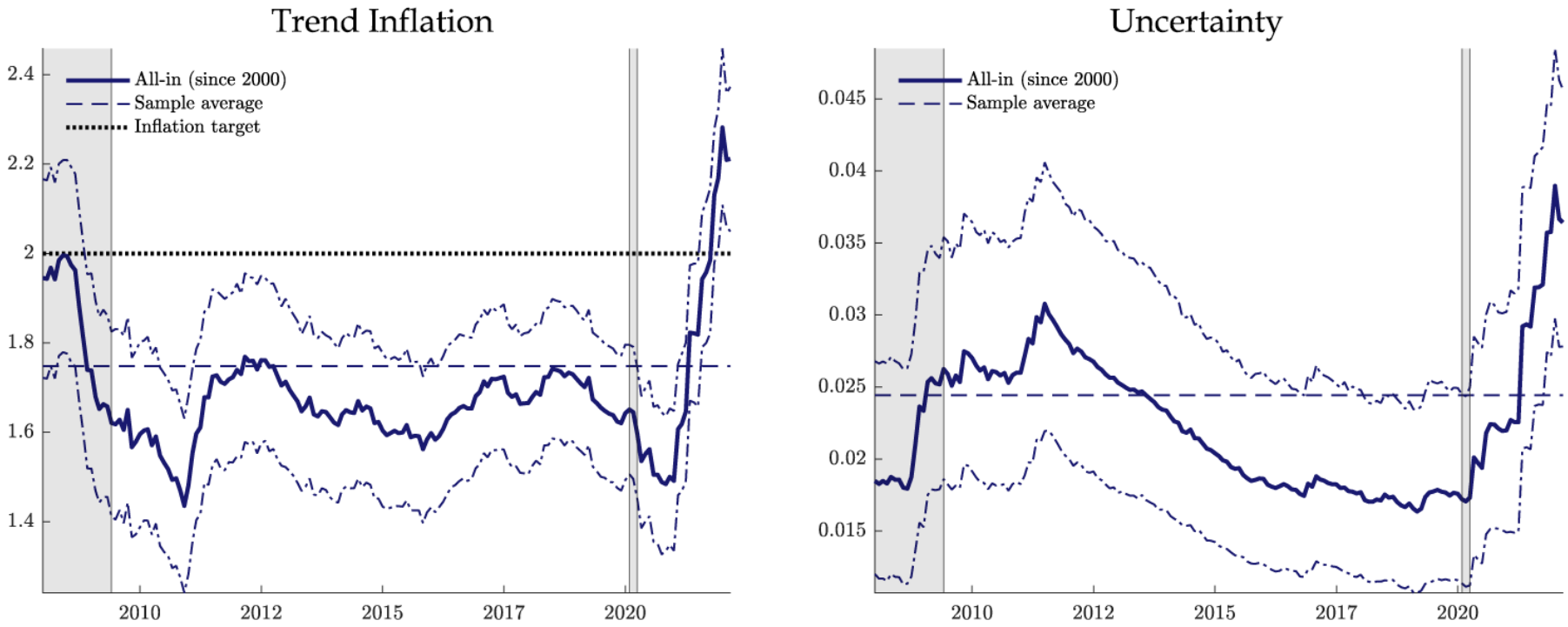
- **Surveys:**

  Forecasts of future inflation from Survey of Professional Forecasters (SPF), Blue Chip, and Livingston Survey

- Baseline model for the period **from January 2000 to March 2022** (period of stable inflation expectations), with robustness going back to January 1960

Results as of March 2022

Figure: Core PCE Trend Inflation and Uncertainty



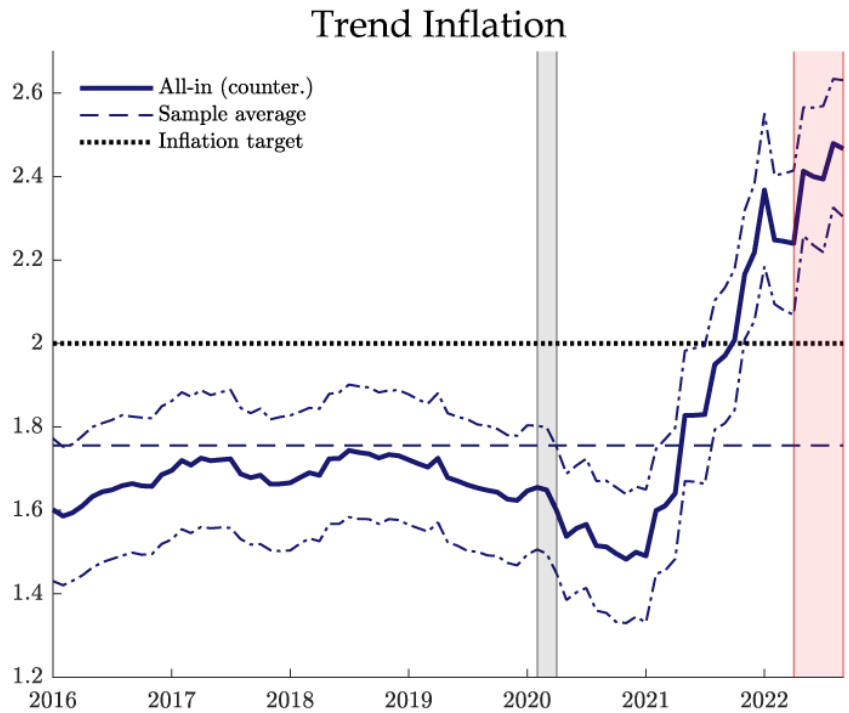
Takeaways:

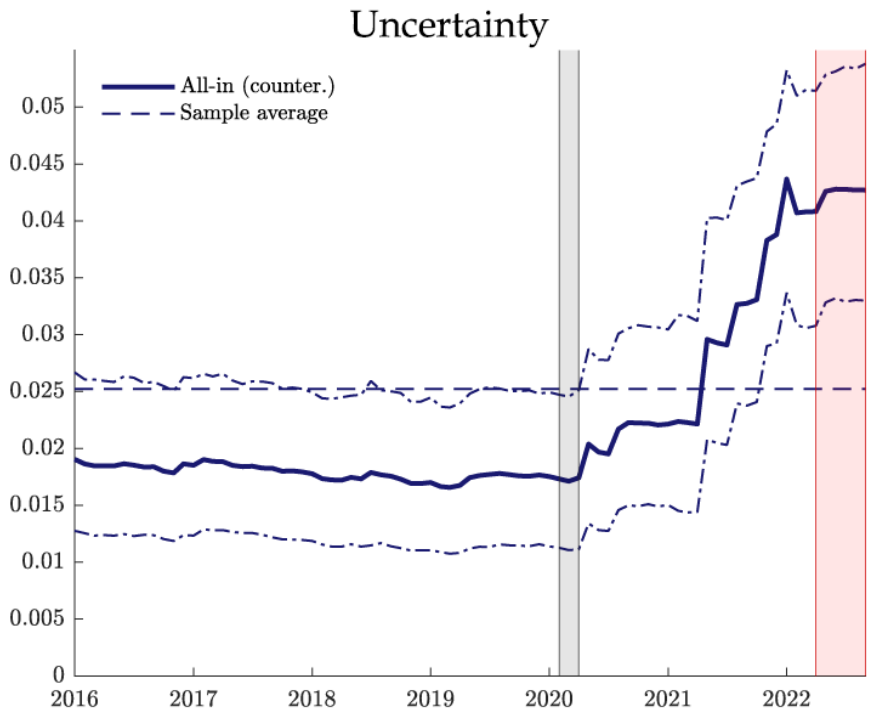
- Notable decline below post-2000 average during COVID-19
- Substantial rebound during the recovery, with high uncertainty

Counterfactual Exercise

"Stress" Scenario:

Inflation expectations deteriorate considerably (2 s.d. increase over six months)





Takeaway:

- Prolonged increase in trend inflation and the risk of de-anchoring

The Role of Inflation Expectations I

- **"Horse race" over four models**:
  1. ***Past Inflation:*** Only includes realized inflation rates (CPI, PCE, GDP deflator)
  2. ***Trimmed***: Only includes trimmed-mean or median realized inflation
  3. ***Surveys***: Only includes survey forecasts of future inflation
  4. ***"All-in" (Baseline):*** Combination of realized inflation rates, trimmed-mean and median measures, and survey forecasts

- **Three sample periods**:
  1. Full sample (Jan/1960 to Mar/2022)
  2. Pre-2000s (Jan/1960 to Dec/1999)
  3. Recent periods (Jan/2000 to Mar/2022)

The Role of Inflation Expectations II

Root-Mean-Squared Errors (RMSE) and Ratios

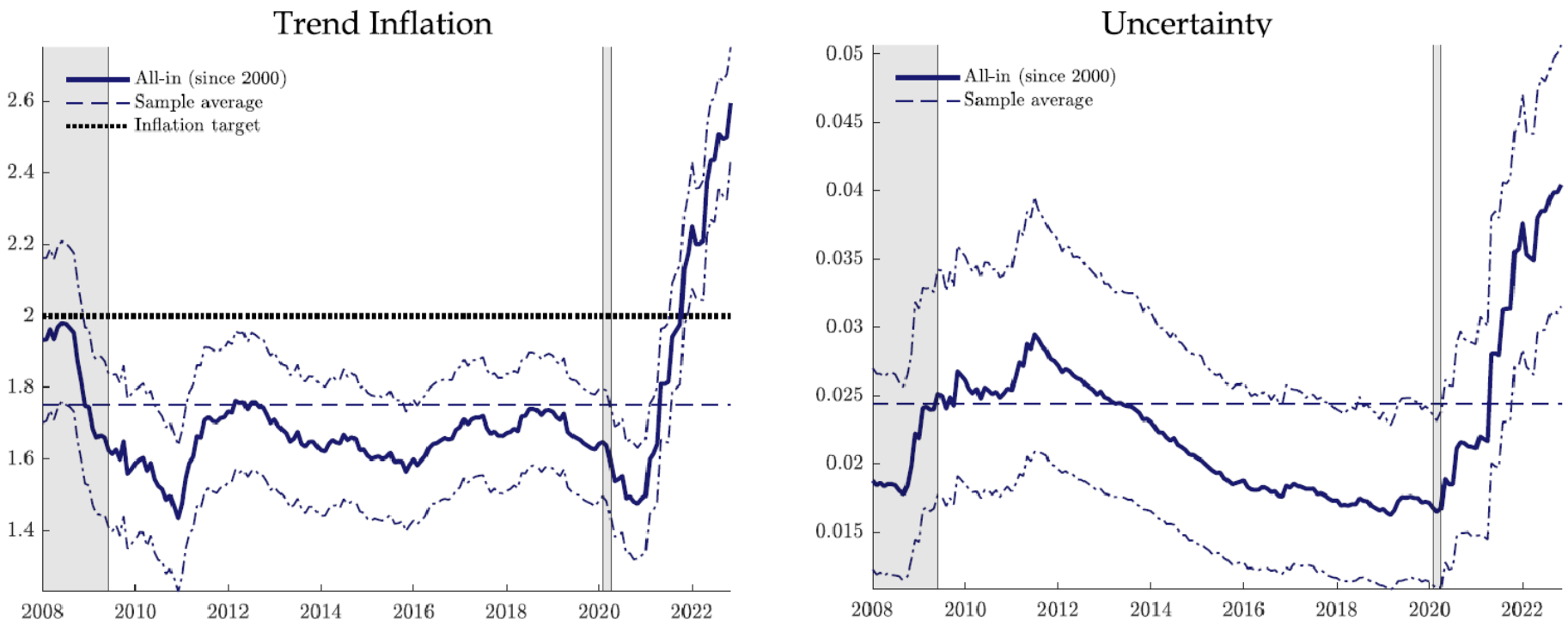
Trend measure	12-months ahead	36-months ahead	60-months ahead
Full sample (Jan/1960 – Jan/2022)			
Past inflation: average deviation	*0.89 percent*	*1.13 percent*	*1.28 percent*
Trimmed and median measures	0.92	0.88	0.81
Surveys	1.19	1.08	1.10
"All-in" (past, trimmed, and surveys)	1.23	1.11	1.12
Pre-2000s (Jan/1960 – Dec/1999)			
Past inflation: average deviation	*0.93 percent*	*1.35 percent*	*1.56 percent*
Trimmed and median measures	0.86	0.84	0.80
Surveys	1.30	1.10	1.10
"All-in" (past, trimmed, and surveys)	1.19	1.06	1.05
Recent periods (Jan/2000 – Jan/2022)			
Past inflation: average deviation	*0.92 percent*	*0.58 percent*	*0.60 percent*
Trimmed and median measures	0.70	0.77	0.67
Surveys	0.68	0.66	0.59
"All-in" (past, trimmed, and surveys)	0.67	0.59	0.47

Takeaway:

- Forecasting ability of all models improves in recent periods
- Survey measures are useful in recent periods
- Baseline over recent sample performs the best

Results as of November 2022

Figure: Core PCE Trend Inflation and Uncertainty



Takeaway:

- Trend inflation and uncertainty even higher than in our counterfactual

Conclusion

- The statistical model provides a useful framework to estimate and track underlying inflation (as perceived by economic agents and forecasters)
- Forward-looking elements coming from surveys' forecasts bring important signals about trend inflation, especially during the current episode
- Trend inflation remains higher than its pre-pandemic low levels, and uncertainty around it is elevated

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References I

Mertens, E. (2016). Measuring the Level and Uncertainty of Trend Inflation. *Review of Economics and Statistics*, **98** (5), 950–967.