Technical Appendix: Correction to "Assessing the Behavior of Recent Inflation."

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Abstract

This appendix contains the details for computing the standard deviation of the 12-month mean inflation rate.

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This appendix contains the details for computing the standard deviation of the 12-month mean inflation rate. To simplify the expressions, I employ the arithmetic mean in place of the geometric mean but the quantitative effect of this approximation is negligible.

Stochastic process for monthly inflation:

$$\pi_t - E(\pi_t) = \rho[\pi_{t-1} - E(\pi_t)] + \varepsilon_t$$

12-month mean inflation:

$$\overline{\pi}_t = \frac{1}{12}\sum_{i=0}^{11}\pi_{t-i}$$

Variance of monthly inflation:

$$Var(\pi_t) = \frac{1}{(12-1)}\sum_{i=0}^{11}(\pi_{t-i} - \overline{\pi}_t)^2$$

Variance of the 12-month mean:

$$\begin{aligned}
Var(\overline{\pi}_t) &= Var\left[\frac{1}{12}\sum_{i=0}^{11}\pi_{t-i}\right] \\
&= \frac{1}{12^2}Var[\pi_t + \pi_{t-1} + \pi_{t-2} + ...\pi_{t-11}] \\
&= \frac{1}{12^2}\left[12Var(\pi_t) + 11\times 2\underbrace{Cov(\pi_t, \pi_{t-1})}_{=\rho Var(\pi_t)} + 10\times 2\underbrace{Cov(\pi_t, \pi_{t-2})}_{=\rho^2 Var(\pi_t)} + ...\right] \\
&\simeq \frac{1}{12^2}\left[12Var(\pi_t) + \underbrace{13.8Var(\pi_t)}_{\text{when}\rho=0.4}\right]
\end{aligned}$$

Standard deviation of the 12-month mean:

$$\begin{aligned}
SD(\overline{\pi}_t) &= \sqrt{Var(\overline{\pi}_t)} \\
&= \frac{\sqrt{1+13.8/12}}{\sqrt{12}}\sqrt{Var(\pi_t)} \\
&= \frac{1}{2.36}\sqrt{Var(\pi_t)}
\end{aligned}$$