Entrenched Inflation Update for 11/24

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Executive Summary

Entrenched inflation is now 2.95%. This currently warrants a Federal Funds Rate target of 3.92%.

Entrenched Inflation

With the Dec. 20 release of the Nov. 2024 PCE-PI, the AR(1) Adaptive Least Squares (ALS) forecast of long-run entrenched inflation is now 2.95%, down from 3.08% last month, and substantially down from 3.52% as recently as last April.

Entrenched inflation is plotted in blue in Figure 1 below, along with observed year-over-year inflation in red. It was consistently over 4.00% throughout 12/21 – 4/23, warranting a Fed Funds rate of at least 5.50% throughout that period. However, entrenched inflation was only twice above 4.57 % during that period, despite year-over-year inflation that exceeded 6.00% throughout 12/21 – 8/22 and even touched on 7.00%. It has consistently been 3.60% or less since 10/23, warranting a rate of no more than 4.90% since that time. Its latest value of 2.95% currently warrants a Fed Funds Rate of 3.92%, down from 4.12% last month.

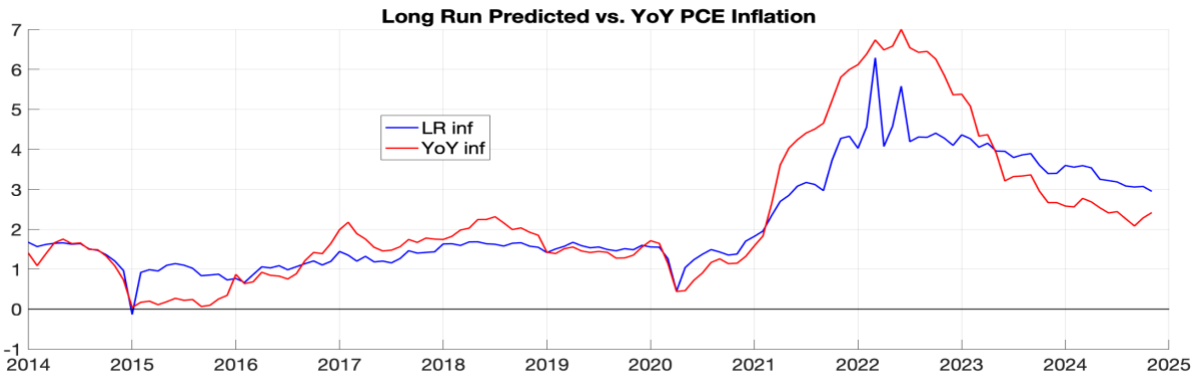

Figure 1

Entrenched (blue) and year-over-year (red) PCE Inflation

ALS is my refinement the Recursive Least Squares (RLS) estimator advocated by Sargent (1993, 1999) and by Evans and Honkapohja (2001). It can parsimoniously estimate

a general linear regression with time-varying parameters. See McCulloch (2024) below for details and references. In that paper I find that a simple model of monthly PCE inflation with a time-varying constant and no autoregressive parameters, as in the early Adaptive Expectations model, can be globally rejected in favor of a model with time-varying AR(1) transients. However, AR(1) cannot be globally rejected in favor of AR(2), AR(3), or AR(4). The likelihood-maximizing noise/signal ratio implies an asymptotic average lag of 21.7 months, using monthly PCE-PI experience back to 1/59.

Since YoY inflation has an average lag of only 6 months, much of the variation in it is indeed "transitory." It consistently overestimated entrenched inflation from early 2021 through early 2023. However, it has consistently underestimated entrenched inflation since that time. The 11/24 uptick in YoY inflation despite the downtick in entrenched inflation was due to the slightly negative monthly value for 11/23 falling off the back end of the 12-month average.

The Taylor Rule

The above Fed Funds Rate recommendations are based on a "Taylor Rule" with a 2.0% inflation target, 150% feedback from expected inflation to interest rates, and a 0.5% "natural" real interest rate, while setting aside the unemployment gap.

Empirical Taylor Rules often find that the FOMC has placed a large coefficient on the lagged policy rate itself. However, the ALS estimate of entrenched inflation already optimally balances the newest information with the old information that went into earlier policy rates, so that adding the lagged policy rate would only unnecessarily lengthen the "Implementation Lag" portion of the already excessive Friedman-Schwartz "Inside Lag" in monetary policy.

The ALS model with AR(1) transients gives a different inflation forecast at each horizon, thus giving any Taylor rule a menu of possible policy horizons to work with. The blue line in Figure 2 below shows predicted average inflation from 11/24 to the dates indicated. The observed 11/24 month-over-month annualized inflation rate of 1.53%, as shown by the green star, together with the time-varying AR(1) coefficient of 0.47, predicts 2.28 % inflation over the coming month, 2.57% over the coming 3 months, and 2.84% over the coming year. However, *marginal* month-over-month predicted inflation, as shown by the red line, rises much more quickly toward the common asymptotic value of 2.95%, reaching 2.80% at 3 months, and rounding to 2.95% for all horizons beyond 8 months.

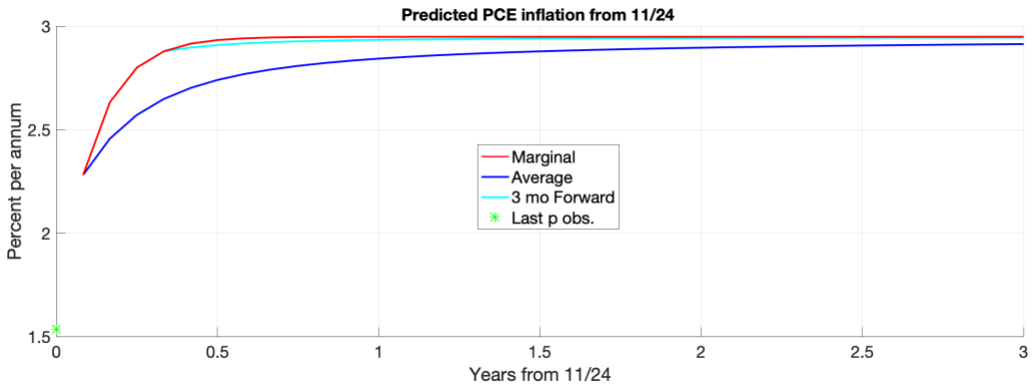

Figure 2

Predicted average (blue), marginal (red), and 3-mo. forward (cyan)

By the time a given month's PCE-PI is announced at the end of the following month, the following month's inflation is already history and can no longer be affected by Fed policy. Since the FOMC only meets 8 times a year, an additional six or seven weeks might also go by before it even meets. It therefore is appropriate, for Taylor Rule policy purposes, to look beyond the first few months, and to focus instead on the forecasts farther into the future. The cyan line in Figure 2 shows the forward forecast for average inflation, beginning 3 months in the future. In most cases this is virtually indistinguishable from the long-run inflation rate. For example, the one-year forecast 3 months forward is already 2.94%.

PCE-PI vs. C-CPI-U?

Dean Croushore ("Revisions to PCE Inflation Measures: Implications for Monetary Policy," *Int'l. J. of Central Banking*, 10/2019, pp. 241-65) has pointed out that the substantial revisions to the PCE-PI one and two months after its first release, and in particular the first annual revision one year later, makes the initial PCE-PI announcements only a rough approximation to their ultimate values.

In my opinion, these revisions mean that the Chained CPI-U (C-CPI-U) would be a much more satisfactory index for Taylor Rule purposes than PCE-PI. It has an upward bias relative to the monthly PCE-PI of only 0.12% per annum since 2000, versus 0.40% for the traditional CPI-U. Like the CPI-U, it is final on first announcement and never revised. It has the minor drawback at present that it is not published in seasonally adjusted form. However, it would be trivial for the BLS to seasonally adjust it. Alternatively, seasonal intercepts could be included in the ALS AR(1) model.

However, since the FOMC officially prefers the PCE-PI, I focus on it in these memos.

VARs?

The best single predictor of future inflation is past inflation itself. It is not inconceivable that other observed variables, such as unemployment or even interest rates themselves, have supplementary predictive power, and ALS could easily estimate a Vector Autoregression (VAR) that incorporates such variables. I plan to investigate that option in the future.

I plan to update this memo's entrenched inflation estimates monthly.

Hu McCulloch is Adjunct Professor at New York University and Professor Emeritus at Ohio State University. *The referenced paper is, "Adaptive Least Squares: Recursive Least Squares with Constant Noise-to-Signal Ratio," Aug. 9, 2024, online via <www.asc.ohio-state.edu/mcculloch.2/papers/ALS/>.*
Future updates of this memo will also be posted via that site. Comments are welcome at mcculloch.2@osu.edu.