DALLAS**FED**

Economic Letter

High Unemployment Points to Below-Target (But Still Stable) Inflation

by Tyler Atkinson and Evan F. Koenig

> ▶ *Households and businesses are generally more interested in where prices are headed than in where they have been.*

The Federal Reserve has a mandate to promote price stability and full employment. Generally, "price stability" is given a forward-looking interpretation. Policy should be conducted so that expected medium-term (two- to five-year) inflation is low and stable or, less strictly, so that expected inflation beyond the next few years is low and stable.[1] Households and businesses, too, are generally more interested in where prices are headed than in where they have been.

How best to forecast inflation is controversial. Many analysts have assumed that changes in inflation depend on the amount of labor market slack: Inflation tends to rise when the unemployment rate is low and to fall when it is high. It follows that you cannot reduce inflation without going through a period of higher-than-normal unemployment. Others, however, believe that slack—at least as we usually measure it—doesn't matter: The best predictor of future inflation is current inflation.
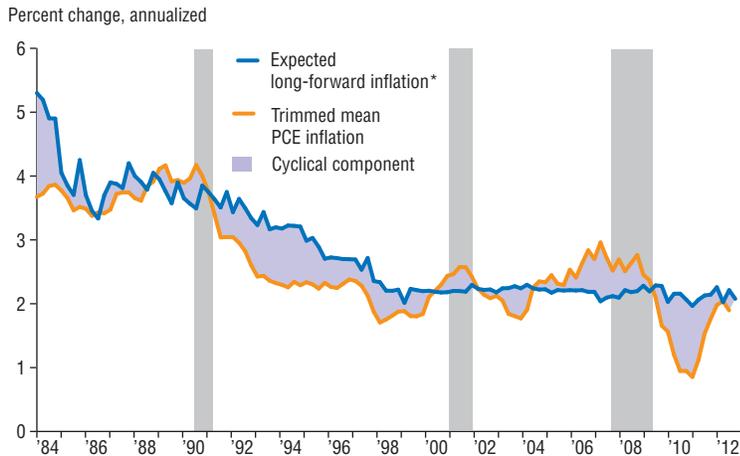
It appears that both of these views oversimplify. Neither is a good approximation over the past 15 years—a period that has been characterized by remarkable stability in long-term inflation expectations. Our research carries the implication that should this stability be maintained, the current high unemploy-

ment rate means that inflation is likely to run somewhat below 2 percent in the coming year. It does not mean, however, that we can expect ongoing declines in inflation.

To see this, it is helpful to decompose inflation into three components. The first is a trend approximated by the inflation rate that professional, private forecasters believe will prevail in the longer term. It excludes the inflation that's expected over the coming year, to minimize business-cycle influences. This expected "long-forward" inflation is low and steady to the extent that the private sector has confidence in the Fed's commitment to long-run price stability. Over the past 15 years, the long-forward expectation is, in fact, well-approximated by a constant value plus a small amount of noise (*Chart 1, blue line*), suggesting that the Fed's price-stability commitment is highly credible.

The second component of inflation is "cyclical." It is the difference between expected long-forward inflation and the Dallas Fed trimmed mean personal consumption expenditure (PCE) inflation rate—a weighted average of price changes in which changes on the high and low extremes are discarded. As its name suggests, the cyclical component of inflation is sensitive to slack. It tends to be positive near business-cycle peaks, when the unemployment rate is low, and negative

Chart 1 — Trimmed Mean PCE Fluctuates Around the Long-Term Trend

Percent change, annualized

Legend:
- Expected long-forward inflation*
- Trimmed mean PCE inflation
- Cyclical component

*Survey of Professional Forecasters expectations of CPI inflation over the nine years starting one year after the survey is taken; 0.3 percentage points is subtracted to adjust for the average difference between CPI and PCE inflation.

NOTE: Gray bars indicate recessions.

SOURCES: Federal Reserve Bank of Dallas; Federal Reserve Bank of Philadelphia; authors' calculations.

Chart 2 — Headline PCE Tends to Converge to Trimmed Mean PCE

Four-quarter percent change

Legend:
- Headline PCE inflation
- Trimmed mean PCE inflation
- Transitory component
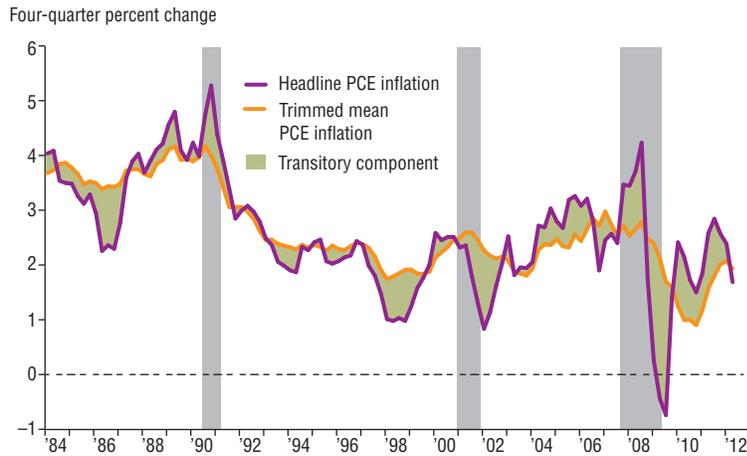
NOTE: Gray bars indicate recessions.

SOURCES: Federal Reserve Bank of Dallas; Bureau of Economic Analysis; authors' calculations.

following business-cycle troughs, when the unemployment rate is high (*Chart 1*).

In practice, the extreme price changes excluded from the trimmed mean inflation rate tend to be temporary—they are usually "one off" increases or decreases that are neither reliably repeated nor reliably reversed and, hence, are not easily forecast. They make up the third and final inflation component, the difference between headline and trimmed mean PCE inflation, which we accordingly label "transitory" (*Chart 2*).

In short, inflation has three parts—a long-run trend that has been constant since the late 1990s, a cyclical component that is strongly related to the unemployment rate and can be forecast with some accuracy, and an unpredictable transitory component.

Inflation and Monetary Policy

At Federal Open Market Committee meetings, policymakers adjust the federal funds rate—what banks charge one another for overnight loans—in response to changes in the economic outlook. These meeting-to-meeting decisions translate, over time, into a path for the money supply. Growth in the supply of money, relative to growth in the real demand for money (determined by real income growth and changes in payments practices over which the Fed has no long-run control), determines the inflation rate. The private sector's perception of where Fed policy will eventually take inflation is captured by a survey of professional forecasters' expectations of inflation over the nine years starting one year after the survey is taken. Prior to 1998, these long-forward inflation expectations are well-forecast by an equation reflecting a three-fourths weighting of the prior year's expected long-forward inflation and one-fourth weighting of the prior year's trimmed mean inflation. Realized inflation below the long-term trend in 1991–96 pulled down the public's long-forward inflation rate expectation, reflecting policymakers' increasingly credible commitment to price stability (as illustrated in Chart 1).

After 1997, the equation that forecasts long-forward inflation expectations puts no significant weight on either lagged expectations or realized inflation. In this period, the best forecast of what expected long-forward inflation will be is a constant—specifically, 2.5 percent consumer price index (CPI) inflation, which translates to 2.2 percent for trimmed mean PCE inflation, when taking into account the average gap between the two.

Predictable Cyclical Component

The theory that the *level* of inflation is directly related to labor-market slack was discredited in the 1970s, when inflation exceeded 10 percent despite a high jobless rate. An alternative theory—that *changes* in inflation are systematically related to slack—then gained currency. This model fit the data fairly well through the mid-1980s. During the subsequent "Great Moderation" period of lower and less-volatile inflation, however, slack's usefulness in inflation forecasting seemed to disappear (*Chart 3*), leading some analysts to conclude that slack holds no predictive power for inflation.[2]

Instead of looking for a relationship between the level of inflation and slack

(the 1960s approach) or between the change in inflation and slack (the 1970s to mid-1980s approach), we look for a relationship between slack and deviations of trimmed mean inflation from expected long-forward inflation (the private sector's perception of the Fed's long-term inflation objective).

The deviation of trimmed mean inflation from expected long-forward inflation (the shading in Chart 1) shows a clear negative relationship with the four-quarter lag of the unemployment rate in post-1983 data (*Chart 4*). When the unemployment rate is high, trimmed mean inflation tends to run below long-forward expectations; conversely, when unemployment is low, the trimmed mean runs above long-forward expectations.

Statistical analysis shows that besides the lagged unemployment rate, the lagged quarterly *change* in the unemployment rate helps explain the gap between trimmed mean inflation and expected long-forward inflation. The lag of the gap matters too. In other words, the cyclical component of inflation is sensitive to both slack and the change in slack, and it is persistent.

Using the resulting regression equation to forecast trimmed mean inflation requires making an assumption about future long-forward inflation expectations. Given the recent stability of these expectations, it is tempting to assume that they will equal their post-1997 average value. A forecast of coming-year trimmed mean inflation constructed in this way would have been much more accurate over the past decade than extrapolating from previous trimmed mean inflation or past long-forward inflation expectations.[3]

Inflation's Transitory Component

Ultimately, people care about price changes for all the goods and services they consume (headline inflation). Indeed, the price changes that are tossed out in the calculation of trimmed mean inflation are probably those most noticed by consumers. However important inflation's transitory component may be, it is unpredictable at a four-quarter horizon. In particular, it shows no systematic relation to slack (*Chart 5*) and no persistence (*Chart 6*).[4] The implication is that the best way to forecast headline inflation

Chart 3 | Idea That Changes in Inflation Are Determined by Slack Now Discredited

Trimmed mean PCE inflation (four-quarter percent change in four-quarter rate)

NOTE: R^2 = 0.018; standard error = 0.431.
SOURCES: Federal Reserve Bank of Dallas; Bureau of Labor Statistics; authors' calculations.

Chart 4 | Slack Matters for Inflation Deviations from Its Long-Term Trend

Cyclical component* (four-quarter percent change)
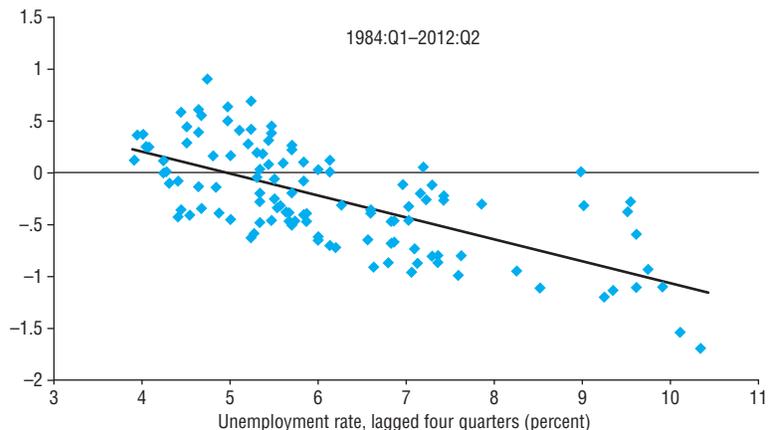
*Trimmed mean PCE inflation minus the long-term trend. The long-term trend is the Survey of Professional Forecasters expectations of CPI inflation over the nine years starting one year after the survey is taken; 0.3 percentage points is subtracted to adjust for the average difference between CPI and PCE inflation. R^2 = 0.470; standard error = 0.369.
SOURCES: Federal Reserve Bank of Dallas; Bureau of Labor Statistics; Federal Reserve Bank of Philadelphia; authors' calculations.

is to forecast trimmed mean inflation. The trimming procedure filters or sifts out "noisy" components from the inflation data, making it easier to discern the underlying relationship between inflation and labor market slack.
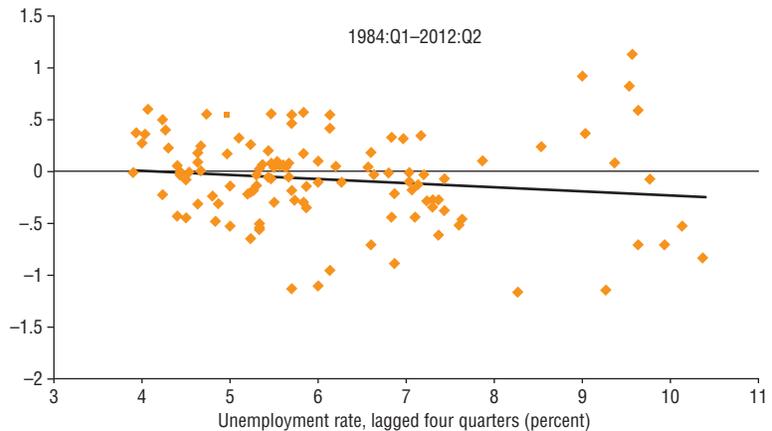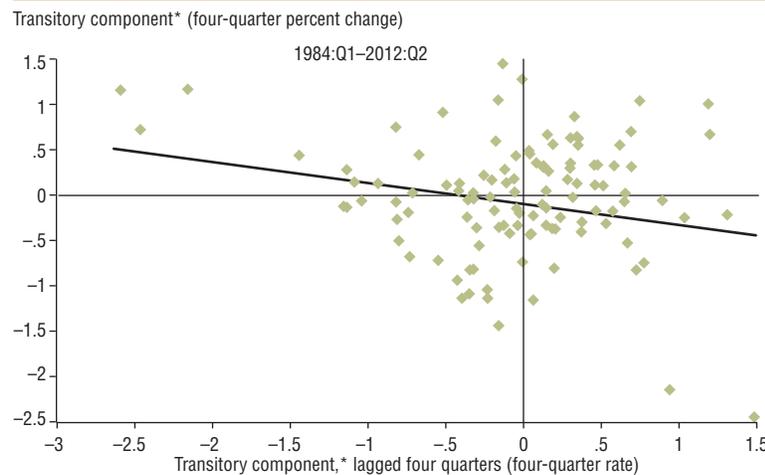
Credibility Is Key

Slack matters for future inflation, but the credibility of the Fed's commitment to long-term price stability also matters. Additionally, the effects of slack are sometimes obscured by transitory inflation movements. When forecasting inflation, it is helpful to use private-sector long-forward inflation expectations to control for changes in the credibility of monetary policy and to strip out the effects of special factors and disruptions by focusing on trimmed mean rather than headline inflation.

Near-term inflation's direct dependence on expected long-forward inflation complicates inflation forecasting.

Chart 5 — Transitory Inflation, the Difference Between Headline and Trimmed Mean Inflation, Shows No Relation to Slack

Transitory component* (four-quarter percent change)

1984:Q1–2012:Q2

Unemployment rate, lagged four quarters (percent)
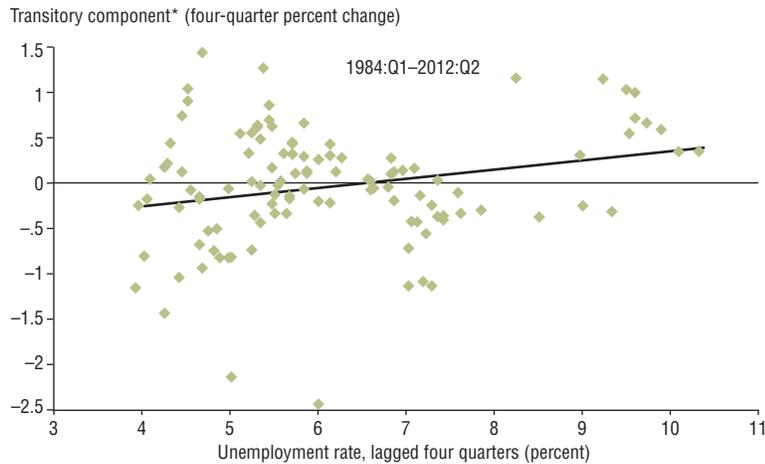
*Headline PCE inflation minus trimmed mean PCE inflation. R^2 = 0.045; standard error = 0.679.
SOURCES: Federal Reserve Bank of Dallas; Bureau of Labor Statistics; authors' calculations.

Chart 6 — Transitory Inflation Shows No Persistence at One-Year Horizon

Transitory component* (four-quarter percent change)

1984:Q1–2012:Q2

Transitory component,* lagged four quarters (four-quarter rate)

*Headline PCE inflation minus trimmed mean PCE inflation. R^2 = 0.046; standard error = 0.679.
SOURCES: Federal Reserve Bank of Dallas; authors' calculations.

Long-forward expectations could adjust to Fed pronouncements about the future conduct of policy as well as to near-term changes in the actual conduct of policy.

Over the past 15 years, expected long-forward inflation has been "well anchored": equal to a constant plus a small random error. This stability, in the face of tremendous fluctuations in economic and financial conditions and changes to the implementation of policy, provides encouragement—but no guarantee—that expected long-forward inflation will hold steady over the year ahead.

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Notes

[1] The Federal Reserve considers a 2 percent inflation rate in the personal consumption expenditures (PCE) price index to be consistent with its price-stability mandate. The 2 percent target rate was made explicit in January 2012. PCE inflation typically runs slightly below the Consumer Price Index (CPI), partly because PCE accounts for consumers substituting away from an item as its relative price increases.
[2] See "Are Phillips Curves Useful for Forecasting Inflation?" by Andrew Atkeson and Lee E. Ohanian, Federal Reserve Bank of Minneapolis *Quarterly Review*, vol. 25, no.1, 2001, pp. 2–11.
[3] See "Inflation, Slack, and Fed Credibility," by Evan. F. Koenig and Tyler Atkinson, Federal Reserve Bank of Dallas *Staff Papers*, no. 16, 2012, www.dallasfed.org/assets/documents/research/staff/staff1201.pdf.
[4] Regressions confirm that the four-quarter lag of the gap between headline and trimmed mean inflation, the gap between trimmed mean inflation and its long-term trend, the unemployment rate and the one-quarter change in the unemployment rate all lack marginal predictive power for transitory inflation.